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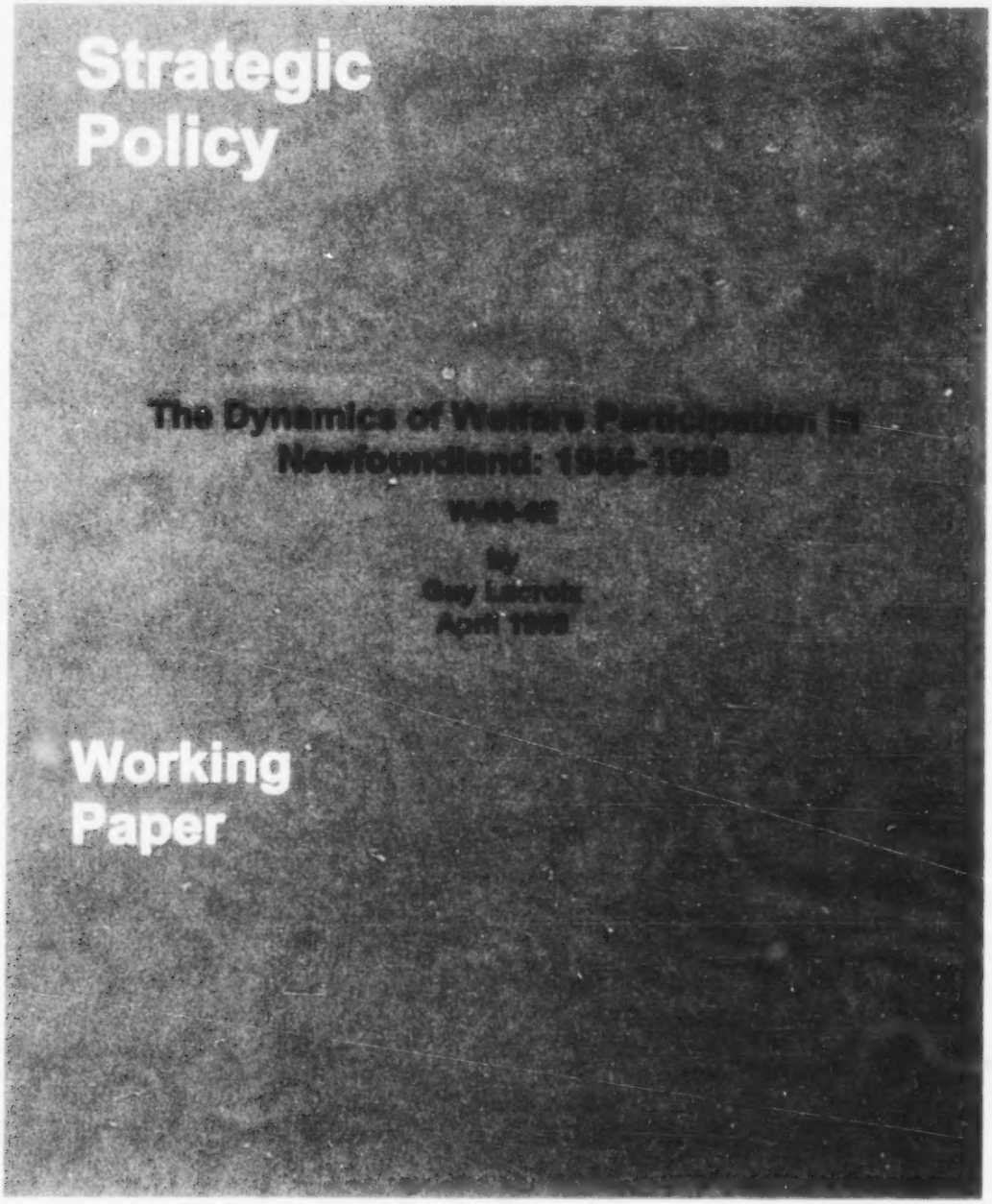

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Politique stratégique
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The Dynamics of Welfare Participation in Newfoundland: 1986-1998

W-00-6E

by
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April 1999

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Abstract

The social assistance programs in Canada established under the Canada Assistance Plan of 1966 were aimed at providing financial assistance via provincial transfers to all individuals in need. Recently, two factors have led some provincial policy makers to advocate changes to their programs. First, significant restraints were placed on federal welfare transfers to non-equalization-receiving provinces in 1990. Second, in most provinces caseloads increased dramatically over the 1980s and 1990s.

An understanding of the dynamics of welfare participation and the effects of the programs are essential elements of any discussion on reforming the system. The current study focuses on welfare dynamics in Newfoundland, using data from the 100% Social Assistance Recipients file between January 1986 and June 1998.

The findings indicate that the majority of starting spells last less than one year, though a certain proportion last beyond six years. Exit rates tend to decrease rapidly at the start of the spells and remain relatively constant thereafter. Overall, single men leave welfare more rapidly than single women. The more educated exit a little sooner than the less educated, and re-entry occurs faster for the less-educated. Business cycles significantly influence exit: during strong economic growth, the exit rate was high, and during recession the rate was almost halved. Individuals living in Labrador have high exit rates. There is also a drastic increase in the exit rates at approximately six years. Returns to welfare generally occur shortly after exit, and at a rate that diminishes with time. Comparisons with welfare studies on British Columbia, Ontario and Quebec conclude that benefits and business cycle conditions have as important an effect on exit rates as in Newfoundland.

Résumé

Les programmes canadiens d'aide sociale, établis en vertu du Régime d'assistance publique du Canada de 1966, visaient à fournir une aide sociale à toutes les personnes dans le besoin, au moyen de transferts provinciaux. Récemment, deux facteurs ont conduit certains décideurs provinciaux à encourager la modification de leurs programmes. . D'abord, les transferts fédéraux en matière d'aide sociale aux provinces ne bénéficiant pas de la péréquation ont été grandement réduits en 1990. Deuxièmement, dans la plupart des provinces, le nombre de cas s'est accru de façon draconienne au cours des années 1980 et 1990.

Il est essentiel à toute discussion sur la réforme du système de bien comprendre la dynamique de la participation à l'aide sociale et les effets des programmes. La présente étude met l'accent sur la dynamique de la participation à l'aide sociale à Terre-Neuve en s'appuyant sur les données du dossier qui inclut toute la population des bénéficiaires de l'aide sociale entre janvier 1986 et juin 1998.

Les résultats indiquent que la majorité des nouvelles périodes d'utilisation durent moins d'un an, bien qu'une certaine proportion d'entre elles durent plus de six ans. Les taux d'abandon tendent à diminuer rapidement au début des périodes d'utilisation et demeurent relativement constants par la suite. Dans l'ensemble, les hommes célibataires abandonnent l'aide sociale plus rapidement que les femmes célibataires. Les personnes plus instruites cessent d'y recourir un peu plus tôt que les moins instruites, et celles qui ont peu d'instruction y recourent de nouveau plus rapidement. Les cycles économiques influent beaucoup sur l'abandon : durant les périodes de forte croissance, le taux d'abandon a été élevé, et durant les périodes de récession, ce taux a chuté de presque la moitié. Les taux d'abandon des résidents du Labrador sont élevés. On observe également une hausse prononcée des taux d'abandon après environ six ans. La réutilisation de l'aide sociale survient généralement peu après l'abandon, selon un taux qui diminue en fonction du temps. Une comparaison avec les études réalisées en Colombie-Britannique, en Ontario et au Québec nous permet de conclure que les prestations et les cycles économiques y exercent, comme à Terre-Neuve, un effet important sur le taux d'abandon de l'aide sociale.

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1. Introduction

The social assistance programs in Canada were established under the Canada Assistance Plan (CAP) of 1966, and aimed at providing financial assistance to all individuals in need. The plan consolidated the set of ad hoc programs that then existed. In recent years Ontario, Alberta and British Columbia have introduced major changes to their programs. Quebec is also in the process of enacting a major overhaul of its program. These changes parallel those introduced in the U.S. through the Personal Responsibility and Work Opportunity Act of 1996.

In Canada, two factors have led provincial policy makers to advocate changes to their program. First, federal transfers under CAP were significantly restricted as of 1990. Indeed, a 5% growth ceiling was then imposed to Ontario, Alberta and British Columbia. Furthermore, cost sharing of welfare expenditures ended in 1995 for the remaining provinces and was replaced by block funding. Second, in addition to these measures, most provinces have witnessed dramatic increases in their caseload over the 1980s and 1990s. In the United States, similar patterns have been observed over the same period [see Moffitt (1992)]. Not surprisingly, increased caseloads and restrictions on federal funding have exerted tremendous fiscal strain on provincial governments.

Admittedly, the primary goal of all these reforms is to somehow control the escalating program costs. In Canada, the empirical evidence brought to bear in public debates on the need for, and directions of, reforms has been anecdotal at best. Implicit in most discussions is the assumption that the welfare system is itself responsible for the growth in caseloads. Yet, welfare programs in Canada have been surprisingly little investigated by economists, as opposed to programs in the U.S. and in Europe. Hence, much of what we know about incentive effects is borrowed from research that focuses on welfare programs that are different from ours in design and/or implemented in different contexts.

A deeper understanding of the dynamics of welfare participation and of the effects of the programmes are essential elements of any discussion leading to an eventual reform of the system. In recent years a number of studies have been conducted using administrative data from British Columbia [Barrett(1996), Barrett and Cragg (1998)], Ontario [Dooley and Stewart (1998)] and

Quebec [Duclos *et al* (1999), Fortin and Lacroix (1997), Lacroix (1999)]. The current study focuses on the dynamics of welfare participation in Newfoundland. The analytical framework is similar to the one used in the aforementioned studies, and thus allows cross-provincial comparisons. The objective of the research is to answer the following questions:

1. What are the main characteristics of the dynamics of participation in social assistance? For example, do exit rates tend to diminish with the length of welfare spells? Conversely, how do re-entry rates tend to vary with the length of time spent off welfare?

2. Do these dynamics vary with the characteristics of households?

3. Which claimants are at risk for lengthy or frequent welfare spells?

4. What is the relative importance of short and long spells in aggregate welfare budgets?

5. Which socio-economic characteristics seem associated with a high overall rate of welfare dependence?

6. To what extent is participation in welfare related to variations in business cycles, seasonal cycles and to program parameters?

To answer these questions, we use a representative sample of individuals who had a claim between 1986 and 1998. Our analysis is therefore conditional on participating in welfare at least once over the sample period and thus does not provide any information on the decision to claim social assistance for the first time over the life cycle. Section 2 of the paper provides a detailed description of the data. In Section 3 we analyse the dynamics of participation using a number of non-parametric statistical tools. Section 4 presents the results of fitting an econometric model to the duration data. We conclude in Section 5.

2. Sampling Procedure and Basic Data Description

The data used in this study are drawn from the 100% Social Assistance Recipients file. The file contains as many as 3,288,593 records on spells that occurred between January 1986 and June 1998. The records are sorted with respect to the Social Insurance Number (SIN) of each recipient and each record contains information on a single month of a specific spell. Once the records are converted into spells, we end up with as many as 102,829 individuals who had a claim during that period.[1]

Naturally, some individuals have severe work impediments and their stay on welfare can be considered nearly permanent. For obvious reasons, these individuals must be excluded from the sample. We use the "Employment Status" variable to determine work eligibility. Thus, anyone suffering from blindness (Code 23), mental illness (Code 24), mental retardation (Code 25), physical illness (Code 26) or "social disability" (Code 27) is excluded from the sample. These criteria reduce our sample size from 102,829 to 85,669 individuals. Thus, 16.7% of welfare recipients must be considered ineligible for work. This proportion is slightly below that observed in Quebec or British Columbia [See Lacroix(1999)].

Table 1 provides basic information on the sample used in this study. The sample sizes of various socio-demographic groups are presented in the second column. The third column shows the total number of spells for each group and the last column reports the corresponding average number of spells. Single parents and families with children constitute the main household type (46% of total). Individuals with secondary schooling and those living either in Central or Eastern Newfoundland are by far the most important groups (72.2% and 71.6% of total, respectively). As shown in the last column, there is considerable recidivism in the data. Individuals in our sample have experienced on average 2.9 spells between 1986 and 1998. Single women aged 30 and over, single parents and families with children return to welfare sooner than others. Similarly, individuals with primary schooling or those living in Labrador have higher return rates than average.

[1] In this study a welfare spell is defined as an uninterrupted sequence of months during which benefits are claimed. A single month without receipt is not considered an interruption. At least two months are necessary. This is a common assumption made when working with administrative data [see Barrett and Cragg (1998)].

Table 1 - **Sample Statistics**

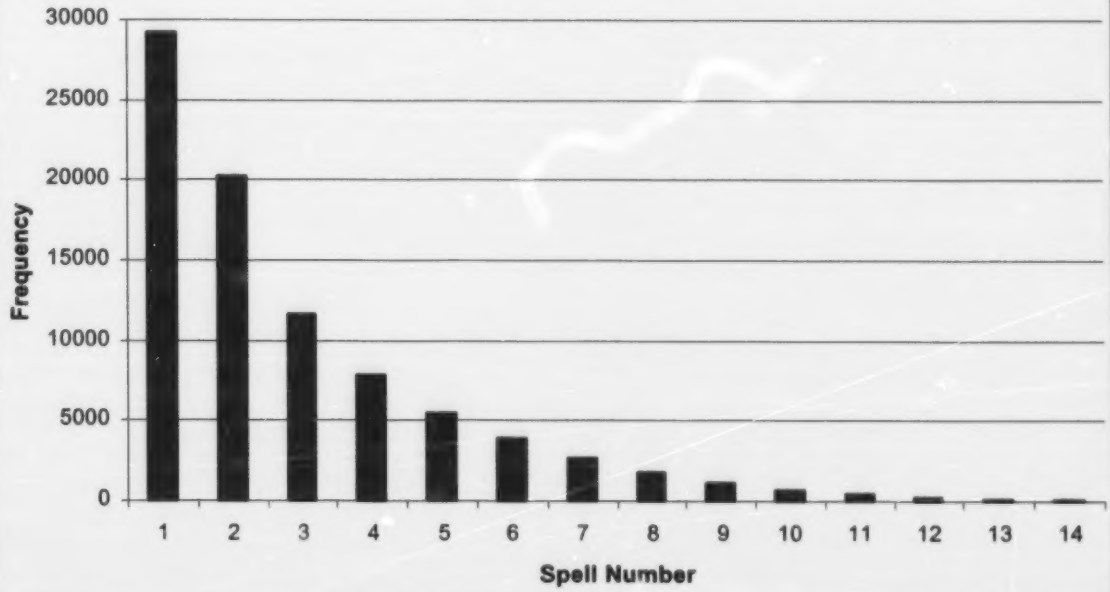
	# Individuals	# Spells	Spells/Individual
Household type			
Single Men 18-24	16,615	38,599	2.32
Single Men 25-30	3,968	9,921	2.50
Single Men 30 +	6,964	18,290	2.63
Single Women 18-24	6,262	12,339	1.97
Single Women 25-30	1,361	3,265	2.40
Single Women 30 +	3,908	13,009	3.33
Single Parents	23,843	75,356	3.16
Families no Children	3,187	9,016	2.83
Families with Children	19,561	68,702	3.51
Total	**85,669**	**248,497**	**2.90**
Level of schooling			
Primary	16,634	58,559	3.52
Secondary	61,872	175,436	2.84
Post-Secondary	3,358	6,905	2.06
University	3,805	7,597	2.00
Total	**85,669**	**248,497**	**2.90**
Region of residence			
East	33,417	94,970	2.84
Central	27,954	80,874	2.89
West	19,830	57,359	2.89
Labrador	4,468	15,295	3.42
Total	**85,669**	**248,498**	**2.90**

To look further into the extent of recidivism, Figure 1 reports the number of individuals who experienced various numbers of spells over the 1986-1998 period. Of the 85,669 individuals in our sample, 29,169 had only 1 spell, 20,310 had 2 spells, 11,668 had 3 spells, *etc*. Recall that at least 2 months without receipt of benefits are necessary to identify return spells. So it is very unlikely that such recidivism is simply a statistical artefact or the result of coding errors.

In studies of welfare dynamics in Canada it has been found that entry into and exit from welfare usually depict strong seasonal patterns [See Fortin and Lacroix (1997)]. Figure 2 plots the monthly distribution of fresh starts for the whole period. There are four striking features in this figure. First, it is clear that entry into welfare follows a seasonal pattern. Within each single year entry rates follow a similar pattern. Second, January and March witness more entries than any other month. This holds for nearly each year in the figure. Third, aggregate business cycles appear to have a definite impact on the level of entries. For instance, entry rates were at their

lowest in the year 1989. Fourth, the months of January 1986, March 1991 and January 1992 witnessed an unusually high level of entries into welfare. These sharp increases coincide with the very poor economic conditions that prevailed at the beginning of 1986 and 1992 as measured, say, by the provincial unemployment rate. On the other hand, the period between 1990 and 1994 witnessed a sustained high level of entry into welfare.

Figure 1 - **Distribution of Spell Frequency**



Just as entries into welfare are closely linked to the overall economic conditions, exits from welfare should similarly follow a procyclical pattern and possibly a seasonal pattern. Figure 3 plots the distribution of exits from welfare for the whole period. For each single year depicted in the figure exits rates are at their highest in February and decline gradually until December. It is readily apparent from the figure that the exit rates are both strongly related to general economic conditions (level of exits) as well as seasonal fluctuations in the business cycle (shape of monthly exits).

Figure 2 - **Distribution of Fresh Spells**

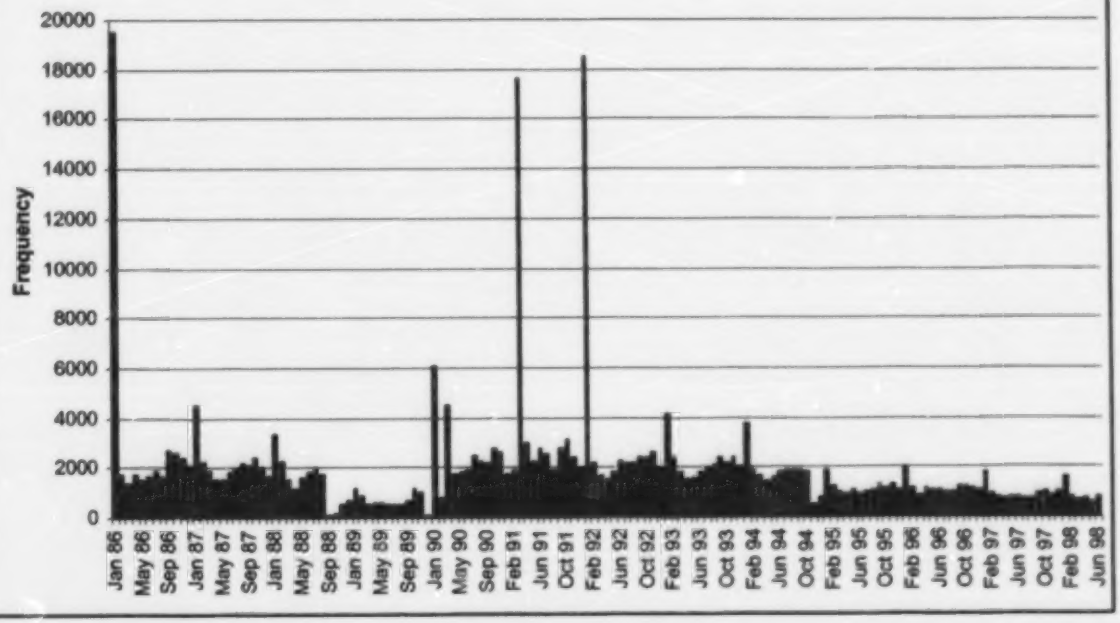
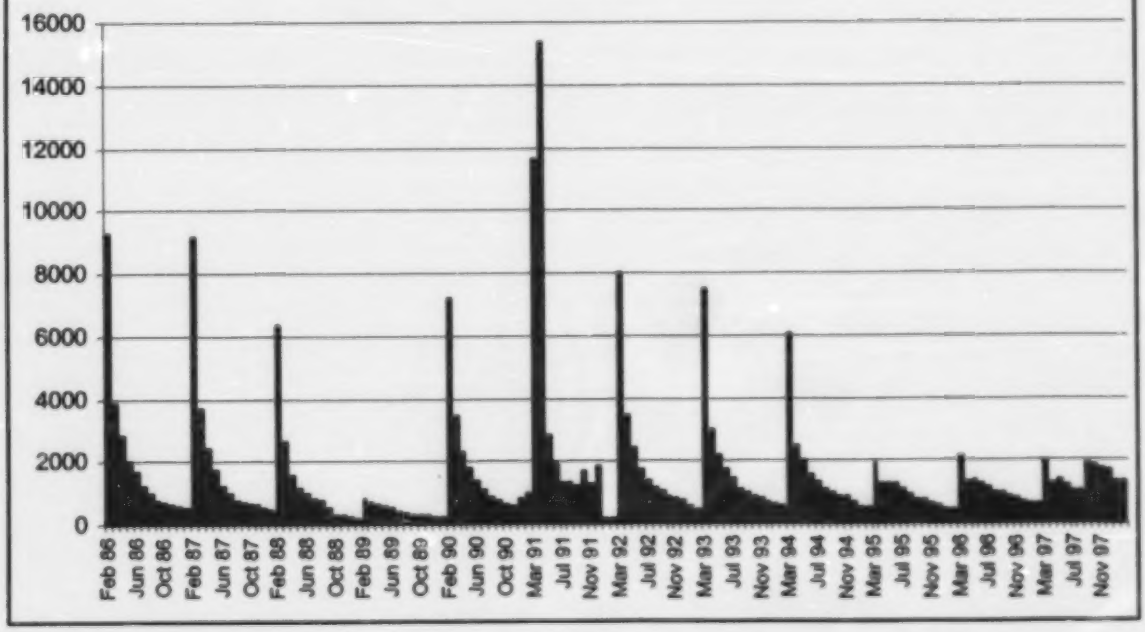


Figure 3 - **Monthly Distribution of Exits**



3. Non-Parametric Analysis of the Welfare Dynamics

Our task in this section is to provide tools that allow an easy characterisation of the complex interactions between inflows and outflows from the welfare rolls. The most efficient way to analyse welfare spells is to use the so-called hazard rates. These are simply defined as the probability that a person who has been on welfare for t-1 months leaves next month (month t). Formally, we write:

$$\lambda(t) = \frac{N(t)}{R(t)}$$

where N(t) is the number of individuals who have exited welfare in month t, and R(t) is the population at risk, *i.e.* the number of individuals who could have exited in month t.[2] It can be shown that the conditional probability of "surviving" t months on welfare, given that an individual has "survived" t-1 months, is related to the former as follows:

$$S(t) = \prod_{t_j<t} (1-\lambda(t_j)), \quad t \geq 0.$$

The expected duration of welfare spells is related to the survival function as follows:[3]

$$E(t) = \sum_{j=1}^{\infty} S(j)$$

These three concepts, hazard rate, survival rate and expected duration, are widely used to describe the dynamics of welfare participation. Two other useful distributions can be computed from the hazard rates. The first is the completed spells distribution. The second is the distribution of ongoing spells. The two are detailed below.[4]

---

[2] Censored observations must be accounted for in the risk set.

[3] Notice that the sum is taken over infinity. Naturally, we can not compute a survival probability for a duration that lasts longer than those observed in the data. In what follows, we will assume that $S(t \mid t > t_{max}) = S(t_{max})$, where t_{max} is the longest observed spell in the data. In other words, the survival probabilities for a duration that last longer than the longest observed duration are assumed constant, and equal to the survival probability of the longest observed duration. This assumption was first made by Gill (1981). Monte Carlo experiments by Klein (1987) showed that this assumption was best in predicting mean duration.

[4] Formal derivation of these distributions can be found in Bane and Ellwood (1985).

Distribution of completed spells [D(t)]:

Assume 100 individuals chosen at random from our sample enter welfare at time T=1. One question we may want to answer is: what is the likely duration distribution of their spells. In order to get the fraction of the 100 spells that will last t months, one simply calculates the fraction who will still be on the program after t-1 months, and multiply that by the probability of exiting after t months. Hence,

$$D(1) = \lambda(1)$$
$$D(2) = \lambda(2)D(1)$$
$$\vdots$$
$$D(t) = \lambda(t)\left\{1 - \sum_{j=1}^{t-1} D(j)\right\}$$

Since the hazard rates can easily be computed from the data, this distribution can also be easily computed.

Distribution of ongoing spells [F(t)]:

Assume we randomly choose 100 individuals from our sample that are in the midst of a spell. Here, we are interested in knowing the likely duration distribution of their spells. Mathematically, this is just the distribution of new spells weighted by the fraction of all those on welfare at a point in time that will be on welfare for exactly t months:[5]

$$F(t) = \frac{tD(t)}{\sum_{j=1}^{\infty} D(j)}$$

The distribution is computed entirely on the basis of the previous distribution [D(t)], which in turn is computed from $\lambda(t)$. So knowledge of the latter allows the derivation of useful distributions that provide valuable insight into the dynamics of welfare participation.[6]

Monthly exit rates from welfare as well as survival rates have been computed for the same socio-demographic groups as those defined in Table 1. They are plotted in Figures 4-8. Commenting on

[5] To be valid, this definition requires that we assume a no growth steady state.

[6] The hazard rates are computed for the entire sample, *i.e.* for the years 1986-1998. As such, they are "average" exits rates since they are computed over different business cycles. On the other hand, and to the extent the years 1986-1998 have witnessed at least two complete business cycles, it might be preferable to use "average" exit rates than exits rates defined over shorter time intervals that are intimately related to business cycles.

each single figure would be too cumbersome. Instead the discussion will highlight their main features.

All the figures essentially have the same shape. Exit rates are at their highest in the first few months following entry, decline rapidly and remain flat for the most part thereafter. This shape is typical of most hazard rate profiles in Canada [see Barret (1998) and Fortin and Lacroix (1997)]. What is not typical is the sudden jump in the exit rates at around 70 months (6 years). This discontinuity is present in the exit profiles of all groups. Note that very few young men and women remain on welfare for such long stays. In fact, all single men and nearly all single women in the 18-24 age group have left welfare before 6 years. Consequently the exit rates between 5-6 years are computed on the basis of few singles.[7] Nevertheless, their profiles are very similar to those of other groups. Furthermore, many families and single men and women aged over 25 experience spells that last more than 5-6 years. Hence the sudden rise in the exit rates is not a statistical artefact. In the absence of any satisfactory explanation, one is tempted to conclude that the discrete jump in the hazard rates may arise as a consequence of a structural feature of the program.

Decreasing exit rates is an indication that individuals exhibit so-called negative duration dependence, *i.e.* the probability of leaving welfare decreases the longer the time spent on welfare. This is consistent with results found in the U.S. and Canada and may arise for different reasons, including changing preferences for leisure, depreciated human capital that shifts the wage offer distribution, or employer screening.[8] Note that the apparent duration dependence may simply be due to unobserved heterogeneity that is not accounted for in calculating exit rates.[9]

[7] Yet, they are still statistically significant at conventional levels for both young men and women at 5 years, and significant for young women at 6 years.

[8] See MaCurdy (1989) for a detailed discussion.

[9] Indeed, if exit from welfare is partly determined by motivation, then the more motivated will leave on average earlier than the less motivated. As a consequence, the proportion of less motivated will increase with spell length. Hence, the nature of the welfare population will change with duration and this in turn will lead to decreasing hazard rates. Thus duration dependence may simply reflect a compositional change in the population rather than a genuine behavioural component.

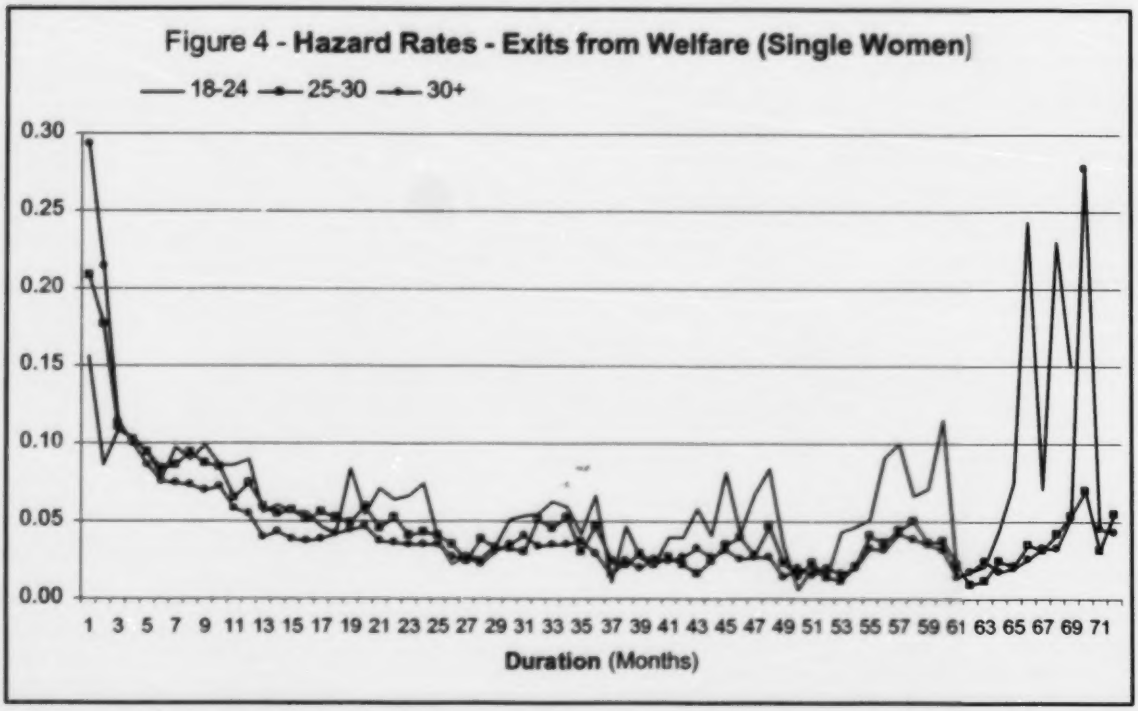


Figure 4 - Hazard Rates - Exits from Welfare (Single Women)
18-24
25-30
30+
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71
Duration (Months)

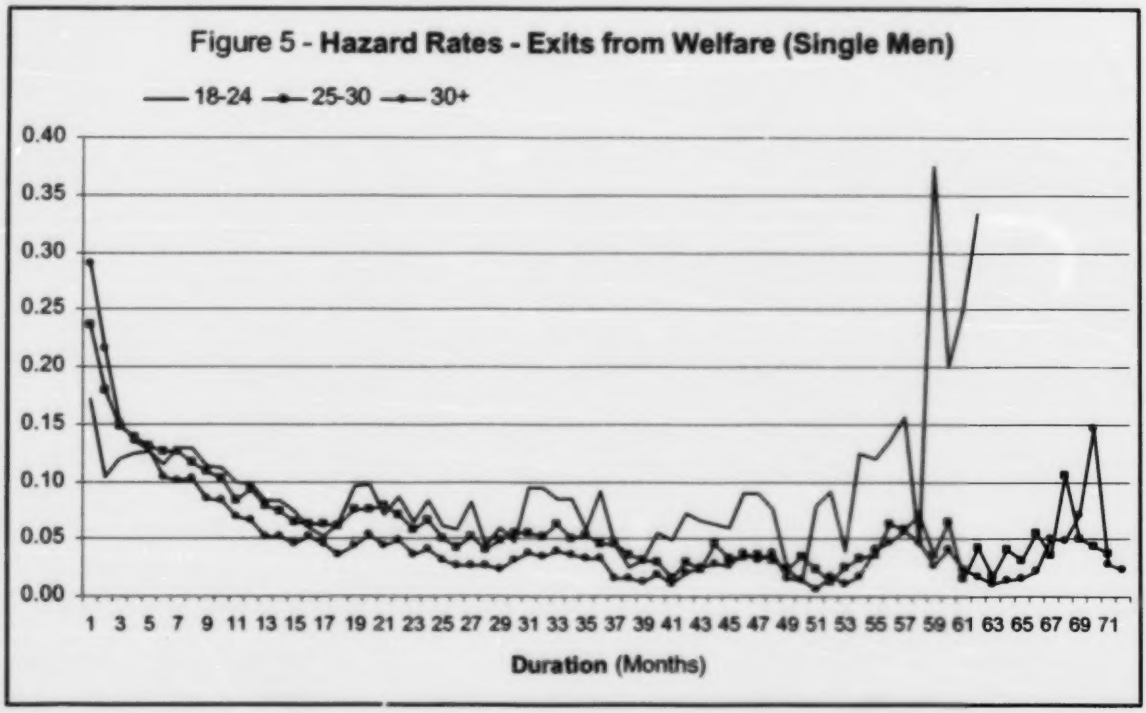


Figure 5 - Hazard Rates - Exits from Welfare (Single Men)
18-24
25-30
30+
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71
Duration (Months)

Figure 6 - **Hazard Rates - Exits from Welfare (Families)**

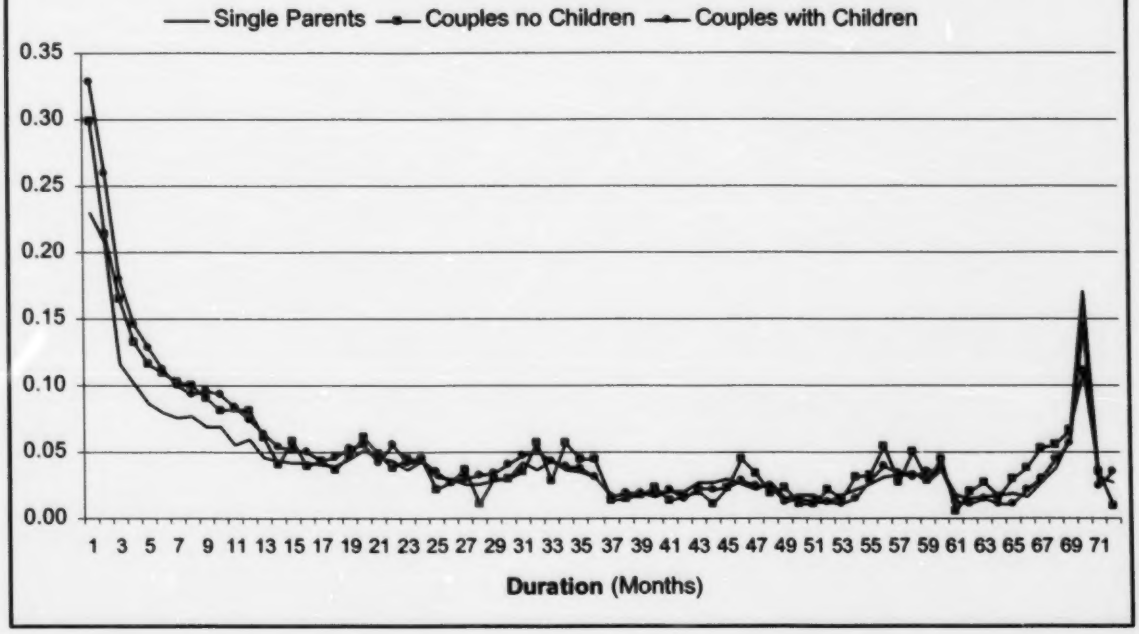


Figure 7 - **Hazard Rates - Exit from Welfare (Level of Schooling)**

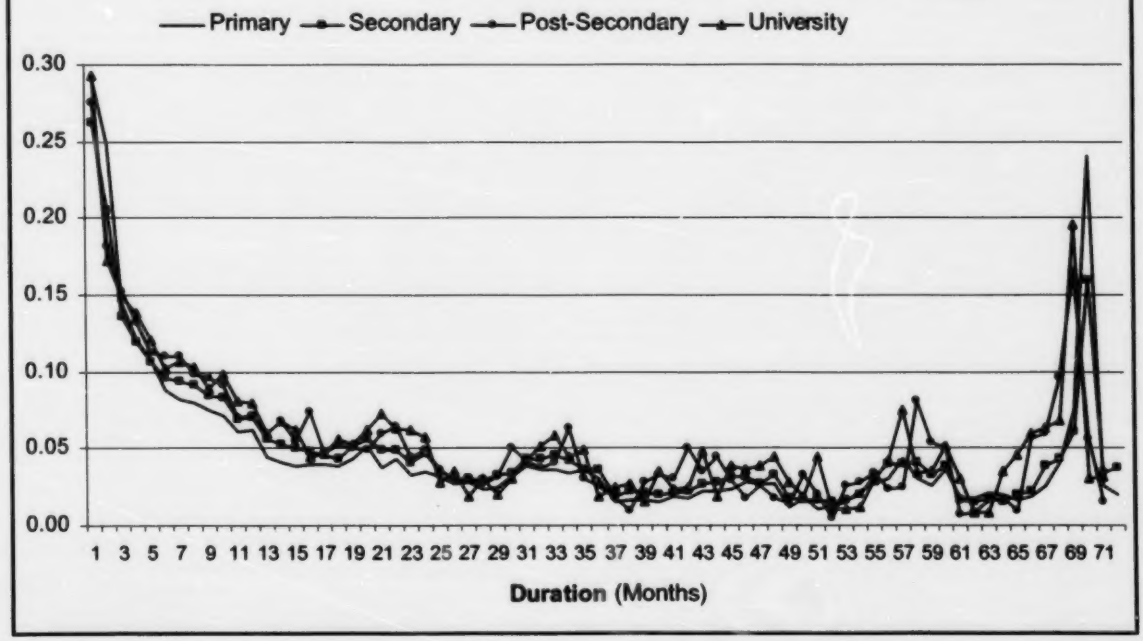
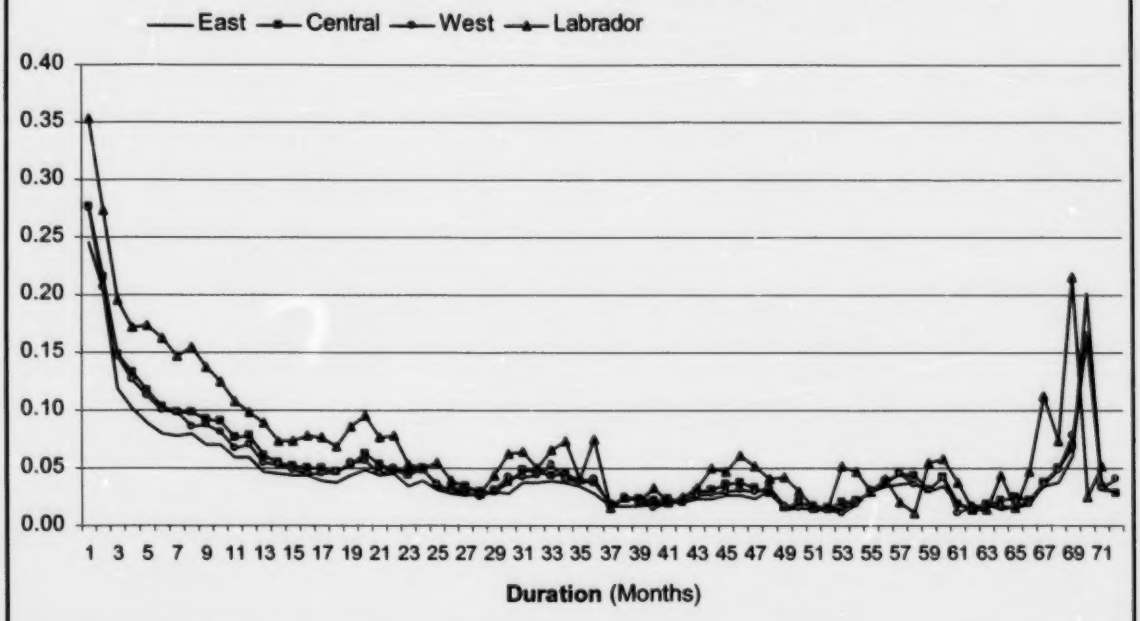


Figure 8 - **Hazard Rates - Exit from Welfare (Region of Residence)**



The figures also indicate that for both single men and women exit rates in the early months are highest for those in the 30+ age group and lowest for those in the 18-24 age group. Single parents have the lowest exit rates of all the families in the 1-13 months range. Finally, the exit rates profile of those living in Labrador is systematically above the other profiles. Consequently we should expect the average spell duration to be smallest in Labrador and higher for single parents. Since the exit profiles for other groups cross at one point no conclusion can be made with respect to mean duration.

As mentioned above, the exit rates can be used to compute various distributions. Tables 2-6 report the exit rates and both the ongoing and completed spells distributions for the same groups as in Figures 4-8. For ease of reading the exit rates reported in the first column of each panel are computed over six month intervals. The middle column contains the completed spells distribution. The rightmost column reports the ongoing spells distribution. These distributions reveal striking evidence that participation in welfare is highly dynamic. To illustrate, let's focus on single women aged between 18 and 24. The middle column indicates that if 100 women in that group started a new welfare spell at any time between 1986 and 1998, 51 would stay on welfare for at most 6 months. Of those who stayed on welfare for more than 6 months, 22 would

leave within the next 6 months. As few as 0.4% would stay on welfare for more than 6 years. The last column, on the other hand, indicates that if 100 single women of that age group were chosen at random at any point in time between 1986 and 1998, only 10.5 would have a stay of less than 6 months and 17.5 would have a stay of 6-12 months. Finally, 1.8 would stay on welfare for more than 6 years.

Table 2 - **Distribution of Welfare Spells - Single Women**

Spell length (months)	*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*	
		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time
	Single women 18-24			**Single women 25-30**			**Single women 30+**		
1-6	44.2	51.0	10.5	53.0	60.1	11.2	59.6	67.2	11.6
6-12	42.7	22.2	17.5	40.7	16.6	13.7	35.5	11.5	10.2
12-18	31.6	7.6	11.9	30.6	6.9	10.2	22.6	4.7	7.1
18-24	32.3	6.9	12.2	26.4	4.3	8.7	21.7	3.6	7.5
24-30	20.7	2.3	6.4	19.7	2.3	6.1	16.5	2.2	5.7
30-36	28.1	3.0	8.8	21.8	2.3	6.7	19.7	2.1	7.1
36-42	20.0	1.2	5.1	16.2	1.1	4.5	13.2	1.1	4.4
42-48	28.5	1.9	7.0	15.3	1.1	4.2	15.7	1.2	5.3
48-54	19.2	0.6	3.6	12.9	0.6	3.3	10.8	0.6	3.4
54-60	35.1	1.4	6.4	20.5	1.1	5.3	18.3	1.1	5.9
60-66	17.8	0.2	2.0	12.2	0.4	2.6	12.0	0.5	3.4
66-72	57.5	1.3	6.9	23.3	0.8	5.1	40.1	1.8	12.3
72+		0.4	1.8		2.4	18.5		2.2	16.1
Expected duration		13.2			13.0			13.2	

A similar analysis can be made for single women of other age groups. The rightmost column of their respective panel shows that if 100 women were chosen at random, 18.5 in the 25-30 age group and 16.1 in the 30+ age group would have a spell lasting more than 6 years. Yet, despite somewhat different dynamics, the average spell duration of all three age groups are very similar at around 13 months, as reported in the bottom row.

Because most spells are quite short does not imply that most individuals on welfare at a point in time are in the midst of a short spell, or that the bulk of the expenditures for the welfare program goes to those with short spells. In fact, quite the opposite is usually true. Consider the situation in a hypothetical hospital. Most of the persons admitted in any year will require only a very short spell of hospitalisation. But a few of the newly admitted patients are chronically ill and will have extended stays in the hospital. If we ask what proportion of all admissions are people who are

chronically ill, the answer is relatively few [Distribution of new spells]. On the other hand, if we ask what fraction of the hospital's beds are occupied by the chronically ill, or equivalently what proportion of the patients in the hospital at any one time are chronically ill, the answer is much larger [Distribution of ongoing spells]. The reason is simply that the chronically ill end up being a sizeable part of the population in the hospital and consequently, consume a sizeable portion of the hospital's beds and other resources.

Data for single men are presented in Table 3. The average spell lengths range between 8.5 and 10.9 months. They are somewhat shorter than single women's, a result that has also been found in Quebec and British Columbia [see Lacroix (1999)]. Table 4 concerns families. As shown in the bottom row, single parent families have the longest average spell duration of all demographic groups. This is also consistent with findings in Quebec and British Columbia. The table shows that as many as 22.5% of all single parents currently on welfare will experience a spell of at least 6 years. This is slightly above the corresponding figures for families with children.

Table 3 - **Distribution of Welfare Spells - Single Men**

Spell length (months)	*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*	
		Persons beginning a spell	Persons at a point in time		*Persons* beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time
	Single men 18-24			**Single men 25-30**			**Single men 30+**		
1-6	49.8	53.0	19.9	59.9	63.9	24.7	64.3	72.5	16.3
6-12	52.1	25.7	24.6	50.4	19.0	20.2	43.4	11.7	13.1
12-18	37.7	8.3	13.1	36.6	6.4	11.6	27.6	4.1	8.0
18-24	39.1	5.3	11.9	35.4	3.9	9.9	23.5	2.9	7.0
24-30	33.5	2.7	7.6	26.6	1.8	6.0	16.6	1.4	4.7
30-36	38.1	2.0	7.1	28.6	1.4	5.8	19.4	1.5	5.8
36-42	26.9	0.8	3.5	19.0	0.7	3.1	10.3	0.5	2.8
42-48	36.2	0.8	4.1	18.5	0.5	2.9	15.7	0.9	4.6
48-54	18.5	0.3	1.4	14.4	0.3	2.0	9.9	0.4	2.7
54-60	41.8	0.5	3.0	25.9	0.5	3.6	21.1	1.0	6.0
60-66	21.4	0.1	0.8	17.3	0.2	1.9	12.2	0.3	2.9
66-72	70.6	0.4	3.0	28.2	0.3	2.9	31.6	0.9	7.7
72+		0.1	0.0		0.8	5.6		1.9	18.3
Expected duration		9.2			8.5			10.9	

Table 4 - **Distribution of Welfare Spells - Families**

Spell length (months)	*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*	
		Persons beginning a spell	Persons at a point in time		*Persons* beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time
	Single parent			**Couples no children**			**Couples with children**		
1-6	55.8	63.0	10.4	64.7	73.3	17.5	69.7	78.2	21.1
6-12	35.7	13.1	10.2	44.8	11.9	14.3	45.6	9.8	14.0
12-18	24.4	5.6	7.6	28.4	3.8	8.3	29.4	3.3	8.1
18-24	23.4	4.5	7.9	24.6	2.8	7.5	25.9	2.3	7.3
24-30	17.1	2.2	5.6	16.2	1.2	4.7	18.6	1.2	4.9
30-36	20.2	2.4	6.8	22.7	1.7	6.9	23.1	1.2	6.1
36-42	11.5	1.0	3.6	12.1	0.5	3.2	11.9	0.4	2.8
42-48	14.2	1.2	4.6	14.0	0.7	3.9	12.7	0.5	3.1
48-54	10.3	0.7	3.2	9.6	0.4	2.6	8.5	0.2	2.0
54-60	16.1	1.1	5.1	20.1	0.8	5.6	16.7	0.5	4.2
60-66	11.6	0.5	3.3	13.8	0.4	3.2	9.3	0.2	2.0
66-72	30.4	1.5	9.0	30.7	0.7	7.1	28.3	0.7	6.7
72+		3.2	22.5		1.7	15.2		1.5	17.7
Expected duration		14.0			10.4			9.2	

Tables 5-7 report distributions computed on the basis of the level of schooling, the region of residence and the starting years of the spells. The dynamics described in these tables can be summarised into three noteworthy findings. First, Table 5 shows that the average spell duration is negatively related to the level of schooling. Although the difference in average duration between primary schooling and university training is only 1.7 month, the proportion of spells lasting more than 6 years is 19.5% and 11.1%, respectively. Together these results indicate that the dynamics of welfare participation are somewhat related to schooling. Second, Table 6 shows that individuals living in Labrador have strikingly different dynamics from those living in Newfoundland. Their average spell duration is 6.5 months, compared to 11.1 (West), 12.0 (Central) and 13.7 (East). Similarly, the proportion of spells lasting more than 6 years is only 4.5% in Labrador as opposed to 16.6% (West), 16.9% (Central) and 21.2% (East). Finally, Table 7 reports data for exit rates and related distributions computed according to the starting year of the spells. One would expect exit rates in recession years to be lower and hence spells to last longer than otherwise. As it turns out, the years 1986, 1989 and 1992 have atypically high average spell duration. Although the average spell duration decreased somewhat after 1992, it has remained relatively high by historical standards. This is consistent with the finding in Figure 3 which underlined the relation between general economic conditions and exits from welfare.

Table 5 - **Distribution of Welfare Spells - Level of Schooling**

Spell length (months)	*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*	
		Persons beginning a spell	Persons at a point in time		*Persons* beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time
		Primary			**Secondary**			**College**			**University**	
1-6	64.3	72.2	14.4	60.2	68.1	14.1	61.3	69.9	16.2	62.3	70.7	17.2
6-12	37.9	10.4	10.4	41.8	13.3	13.3	45.3	13.5	15.3	45.6	13.5	16.0
12-18	23.8	3.9	6.9	28.3	5.0	8.8	32.3	5.3	10.1	31.4	4.8	9.8
18-24	22.3	3.1	7.0	25.7	3.6	8.2	28.0	3.2	8.4	31.5	3.6	9.8
24-30	15.8	1.7	4.9	19.0	1.8	5.7	18.9	1.6	5.1	17.7	1.1	4.6
30-36	19.6	1.8	6.4	22.1	1.9	6.6	23.7	1.5	6.5	24.6	1.5	6.8
36-42	10.8	0.7	3.3	13.4	0.8	3.6	13.5	0.8	3.3	13.8	0.7	3.3
42-48	13.3	0.9	4.2	15.6	0.9	4.3	18.6	0.7	4.5	18.8	0.8	4.5
48-54	9.2	0.5	2.8	11.0	0.5	2.8	11.2	0.4	2.5	15.1	0.4	3.2
54-60	16.7	0.9	5.3	18.7	0.9	4.9	22.2	0.8	5.1	20.5	0.7	4.4
60-66	12.5	0.4	3.6	11.9	0.3	2.7	9.9	0.1	1.8	12.9	0.3	2.3
66-72	37.0	1.5	11.2	31.2	1.0	7.4	36.7	0.9	7.3	38.3	0.7	7.0
72+		2.2	19.5		2.0	17.7		1.4	13.9		1.1	11.1
Expected duration		11.8			11.6			10.5			10.1	

Table 6 - **Distribution of Welfare Spells - Region of Residence**

Spell length (months)	*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*	
		Persons beginning a spell	Persons at a point in time		*Persons* beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time
		East			**Central**			**West**			**Labrador**	
1-6	56.9	60.9	10.8	63.0	65.5	13.7	61.9	70.0	15.3	74.1	83.6	34.1
6-12	36.6	14.8	10.5	44.3	14.6	12.1	42.0	12.4	13.2	59.2	9.7	21.9
12-18	24.7	6.1	7.6	30.0	5.4	7.9	27.9	4.7	8.6	40.1	2.7	9.9
18-24	22.7	4.2	7.5	27.1	3.5	7.4	26.4	3.5	8.4	37.7	1.5	7.8
24-30	17.0	2.4	5.6	19.4	1.8	4.9	18.6	1.7	5.5	22.9	0.6	3.7
30-36	19.3	2.3	6.5	23.4	1.8	6.1	23.3	1.8	7.0	30.6	0.6	4.8
36-42	11.5	1.1	3.6	14.0	0.9	3.4	13.6	0.7	3.6	18.2	0.2	2.2
42-48	13.6	1.1	4.4	17.2	0.9	4.3	15.4	0.9	4.2	23.7	0.3	2.8
48-54	10.4	0.7	3.3	11.3	0.5	2.8	10.2	0.4	2.5	14.2	0.1	1.4
54-60	17.5	1.1	5.6	19.0	0.8	4.5	18.6	0.8	4.9	18.4	0.1	1.8
60-66	11.3	0.6	3.2	13.5	0.4	2.8	11.7	0.3	2.6	20.5	0.1	1.8
66-72	33.7	1.7	10.1	32.5	1.8	13.2	32.4	1.0	7.6	40.9	0.2	3.3
72+		3.0	21.2		2.0	16.9		1.8	16.6		0.3	4.5
Expected duration		13.7			12.0			11.1			6.5	

Table 7 - **Distribution of Welfare Spells - Year of Spell**

Spell length (months)	*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*	
		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time
		1986			**1987**			**1988**			**1989**			**1990**	
1-6	29.4	66.3	13.1	39.9	79.1	28.3	42.8	83.4	32.4	10.1	43.8	9.0	30.4	70.2	24.7
6-12	17.3	13.1	12.1	25.2	11.3	20.6	29.1	8.7	18.5	9.0	18.3	13.8	20.4	14.8	23.0
12-18	15.5	5.0	8.0	21.8	4.6	14.2	22.7	2.1	7.8	9.7	9.4	11.8	16.9	9.4	26.6
18-24	13.1	3.7	7.6	18.4	1.6	7.5	20.3	1.0	4.4	9.1	9.2	12.3	15.2	5.3	22.3
24-30	12.5	2.5	6.5	15.4	0.8	4.3	19.7	1.0	5.5	9.4	12.7	31.3	13.6	0.0	0.2
30-36	10.2	2.1	7.6	13.8	0.4	2.6	17.4	1.8	10.3	7.7	6.4	21.0	11.7	0.0	0.2
36-42	9.0	0.9	3.4	11.2	0.3	2.1	17.6	1.1	11.2	7.2	0.0	0.1	10.3	0.0	0.2
42-48	8.0	0.7	3.1	12.5	0.5	3.2	14.3	0.9	9.9	6.8	0.0	0.1	10.1	0.0	0.3
48-54	7.8	0.4	2.2	11.6	0.9	8.9	8.7	0.0	0.0	6.4	0.0	0.1	9.2	0.0	0.2
54-60	7.7	0.7	3.5	13.4	0.6	8.3	11.3	0.0	0.0	6.8	0.0	0.1	8.5	0.0	0.0
60-66	7.6	0.9	5.8	12.1	0.0	0.0	9.1	0.0	0.0	5.1	0.0	0.0	11.9	0.0	0.1
66-72	7.1	3.8	27.0	12.0	0.0	0.0	8.2	0.0	0.0	5.7	0.0	0.0	14.9	0.0	0.1
72+		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.6		0.0	2.0
Expected duration		11.2			6.2			5.8			13.1			6.7	

Table 7 (Continued)

Spell length (months)	*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*	
		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time
		1986			**1987**			**1988**			**1989**			**1990**	
1-6	29.4	84.2	29.7	23.3	51.5	9.0	30.3	63.1	12.7	29.4	63.3	15.1	11.4	43.4	10.1
6-12	56.9	8.7	16.3	12.7	12.3	10.3	16.1	12.4	12.0	15.0	13.1	15.2	8.1	17.4	15.3
12-18	19.6	1.7	5.3	10.0	5.7	8.0	13.4	6.1	10.1	13.5	5.3	10.2	8.8	8.4	12.8
18-24	15.3	0.9	4.0	8.1	4.3	8.0	11.5	3.9	8.8	12.1	3.1	7.9	9.5	6.2	12.7
24-30	12.0	0.6	3.3	6.7	2.8	6.8	10.2	2.0	5.9	10.9	2.3	7.6	8.9	4.9	12.6
30-36	13.2	0.5	3.6	6.1	2.9	8.9	8.4	1.4	5.2	9.6	2.1	8.3	7.6	10.8	30.8
36-42	12.1	0.5	4.0	6.1	1.8	6.3	7.8	1.2	4.8	8.8	1.6	7.8	6.7	0.0	5.7
42-48	19.4	0.3	2.6	5.1	1.4	6.1	6.7	1.2	5.5	8.0	4.7	22.7	6.9	0.0	0.0
48-54	15.5	0.2	2.5	5.1	1.2	5.2	6.9	1.2	5.6	8.1	0.0	5.1	6.0	0.0	0.0
54-60	15.7	0.3	2.6	5.1	1.2	6.3	6.8	4.7	24.5	6.9	0.0	0.0	5.8	0.0	0.0
60-66	5.6	0.2	2.5	3.9	1.2	6.6	5.6	0.0	5.0	5.5	0.0	0.0	4.8	0.0	0.0
66-72	5.6	0.2	3.0	3.3	2.7	16.1	5.9	0.0	0.0	5.2	0.0	0.0	5.3	0.0	0.0
72+		1.5	20.8		10.8	2.4		2.8	0.0		4.5	0.0		8.9	0.0
Expected duration		8.4			20.7			12.5			11.7			15.2	

The above discussion has highlighted the fact that the exit rates differ sometimes substantially across demographic groups. Studying the groups separately helps in determining how the sample should be split when conducting econometric analyses. Apart from the fact that some groups appear to behave differently from one another, it may be useful to test to what extent these differences are statistically significant. The upper panel of Table 8 presents a matrix of Wilcoxon tests between the survival rates of various demographic groups. These test statistics are $\chi^2(1)$ under the null assumption that the survival rates between any two groups are identical. Given a critical value of $\chi_{.05}^2(1) = 3.84$, it must be concluded that most groups differ significantly from one another. There are a few exceptions, though. For instance, single men between 25-30 and single women 30+ have statistically similar survival rates. Single men aged 30+ and families with no children also appear to have similar rates. The upper panels of Tables 9 and 10 report similar test statistics based on region of residence and levels of schooling. As mentioned previously, Labrador is drastically different from the other regions, whereas the Central and West regions, although different at the 5% level, are nevertheless relatively similar. Finally, Table 10 underlines the fact that there seems to be little or no difference between educational groups. Consequently, some of the differences in mean duration reported in Table 5 are likely not statistically significant.

So far we have limited the analysis to welfare spells. Given the extent of recidivism in the data, one can instead focus on the elapsed time between two welfare spells. In what follows we will refer to these as off-welfare spells. Figures 9-13 plot the exit rates of off-welfare spells for the same socio-demographic groups as before. The main features of all these figures are the two spikes at 4 and 10 months and the gradual decline following 16 months.[10] Hence, once individuals leave welfare, the likelihood of returning is highest before one year. Given the complexity of the exit rate profiles it is best to rely on formal tests to determine whether there are any systematic differences between them. The bottom panels of Tables 8-10 report the Wilcoxon matrices for the off-welfare spells. Interestingly they indicate that single men and women aged between 18 and 24 have similar survival patterns off welfare. As with welfare spells, single men

[10] It certainly would be worthwhile investigating the reasons why returns to welfare increase singnificantly at 4 and 10 months.

in the 25-30 age group and single women aged 30+ are also statistically indistinguishable. Tests on the region of residence also indicate that only the Central and West regions depict similar patterns. Finally, whereas the educational groups could hardly be distinguished on the basis of their welfare survival patterns, now it appears as though there are important differences in the survival patterns of off-welfare spells. Indeed, only the university and college trained have any resemblance. Other educational groups depict systematic differences that should have noticeable effects on the average length of stays off welfare.

Table 8 - **Wilcoxon Tests - Demographic Groups**

	Single men 18-24	*Single men 25-30*	*Single men 30+*	*Single women 18-24*	*Single women 25-30*	*Single women 30+*	*Single parent*	*Families no children*	*Families with children*
Exits from welfare									
Single men 18-24	-								
Single men 25-30	291.18	-							
Single men 30+	664.72	108.22	-						
Single women 18-24	89.33	602.29	983.92	-					
Single women 25-30	13.84	188.06	548.74	158.46	-				
Single women 30+	276.49	2.23	57.41	534.46	192.54	-			
Single parent	76.55	142.32	764.06	297.87	20.32	194.72	-		
Families no children	485.08	81.48	3.05	755.46	349.55	44.47	313.57	-	
Families with children	1503.96	711.09	346.92	1783.30	1483.62	530.32	3041.12	77.27	-
Returns to welfare									
Single men 18-24	-								
Single men 25-30	76.66	-							
Single men 30+	157.90	29.42	-						
Single women 18-24	3.88	88.08	156.70	-					
Single women 25-30	200.50	56.76	15.02	203.34	-				
Single women 30+	68.76	1.57	56.36	78.86	80.56	-			
Single parent	593.95	461.83	458.27	519.62	123.64	604.97	-		
Families no children	223.47	90.82	44.38	230.34	9.22	117.70	26.70	-	
Families with children	713.32	626.69	659.11	611.03	205.85	818.49	29.67	59.09	-

Table 9 - **Wilcoxon Tests - Regions**

	East	*Central*	*West*	*Labrador*
		Exits from welfare		
East	-			
Central	780.76	-		
West	440.91	16.49	-	
Labrador	2111.73	913.77	986.08	-
		Returns to welfare		
East	0.00			
Central	14.42	0.00		
West	34.27	5.68	0.00	
Labrador	273.83	195.67	145.97	0.00

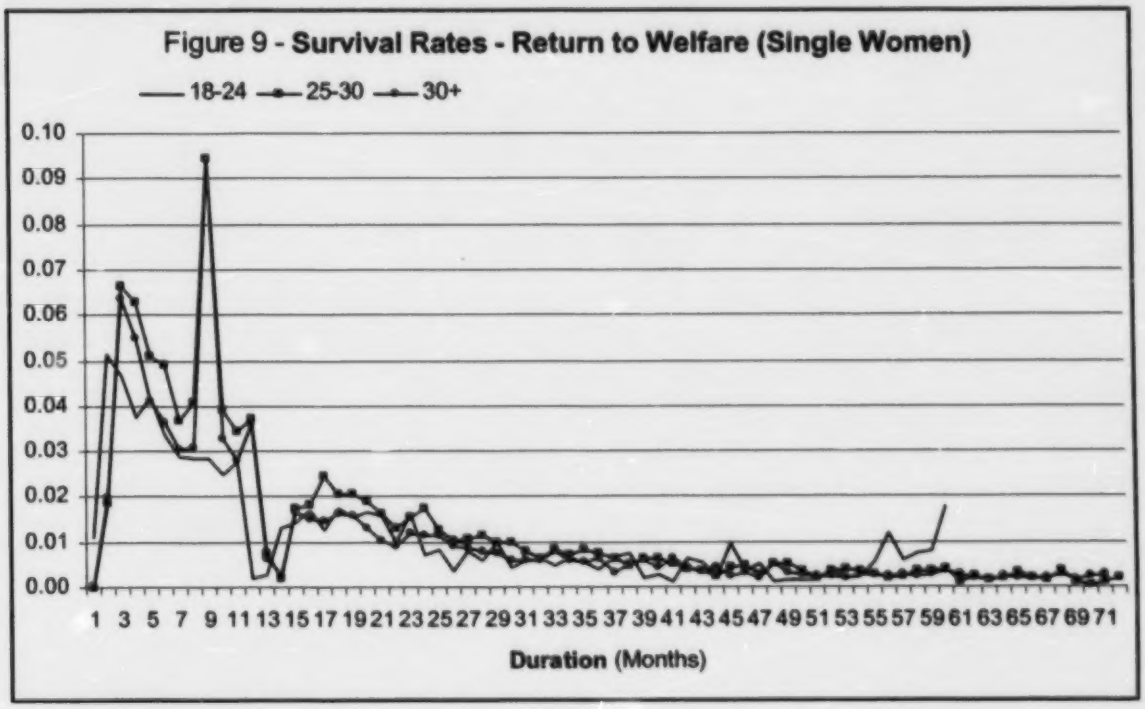
Table 10 - **Wilcoxon Tests - Level of Schooling**

	Primary	*Secondary*	*College*	*University*
		Exits from welfare		
Primary	-			
Secondary	288.61	-		
College	14.51	7.79	-	
University	3.33	26.52	2.47	-
		Returns to welfare		
Primary	-			
Secondary	316.84	-		
College	505.37	285.10	-	
University	679.63	415.61	4.49	-

The statistical tools used so far lend themselves well to the analysis of off-welfare spells since they can easily handle right censoring in the data.[11] Tables 11-15 present exit rates and both ongoing and completed off-welfare spell distributions. To avoid lengthy discussions we will simply highlight the main results. First, Tables 11-13 show that single men and women in the 18-24 age group have the shortest stays off welfare, that single men and women in each age group have almost identical spell lengths, and that single parents and families with or without children have almost identical stays off welfare. The most interesting results concern the educational groups and are reported in Table 14. The table unveils a positive relation between educational attainment and the average length of off-welfare spells. This result has important policy implications. Finally, Table 15 reports the results for the four geographic areas. The three

[11] An individual may leave welfare and not return within our time frame, *i.e.* before June 1998. In this case his stay off-welfare is considered right-censored. Naturally, there are many more censored off-welfare spells than welfare spells. Hence, the appropriateness of the non-parametric tools.

Newfoundland regions have similar average spells duration. On the other hand, individuals in Labrador have much shorter stays off welfare.



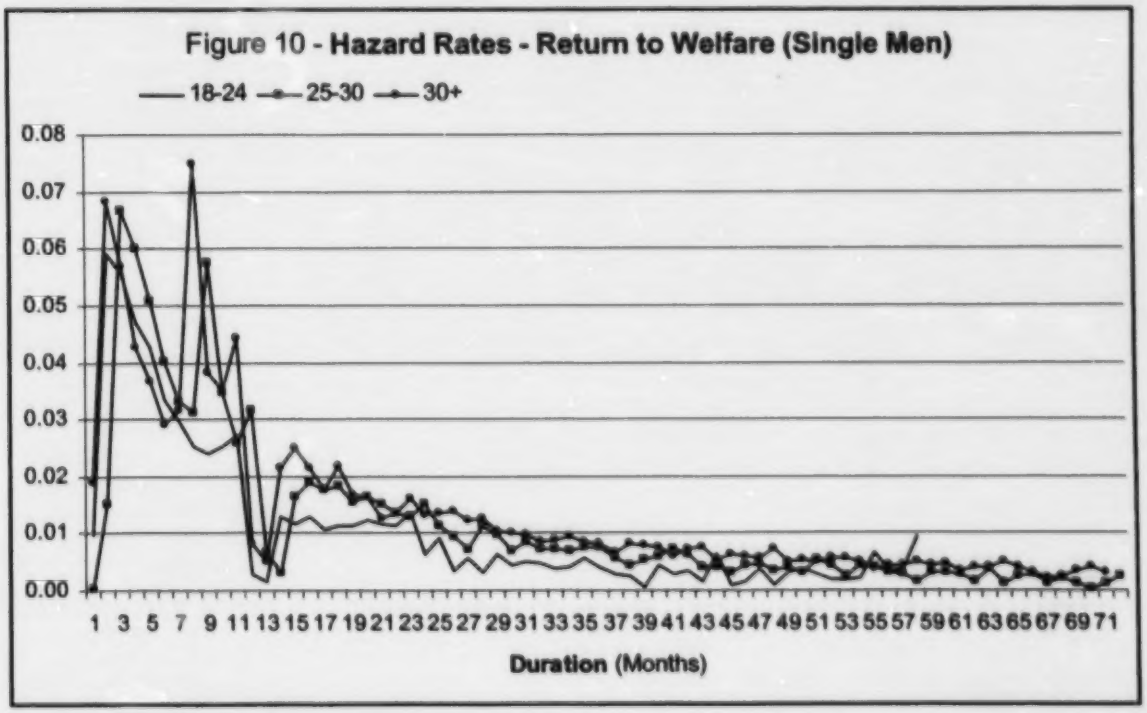


Figure 11 - **Hazard Rates - Return to Welfare (Families)**

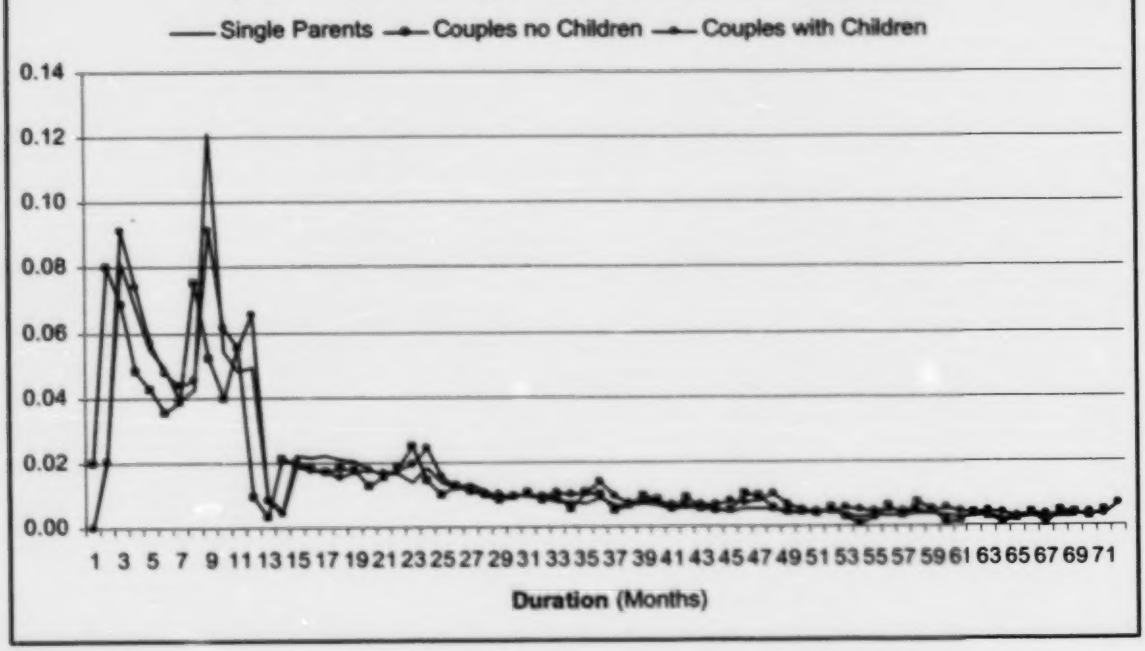


Figure 12 - **Hazard Rates - Return to Welfare (Level of Schooling)**

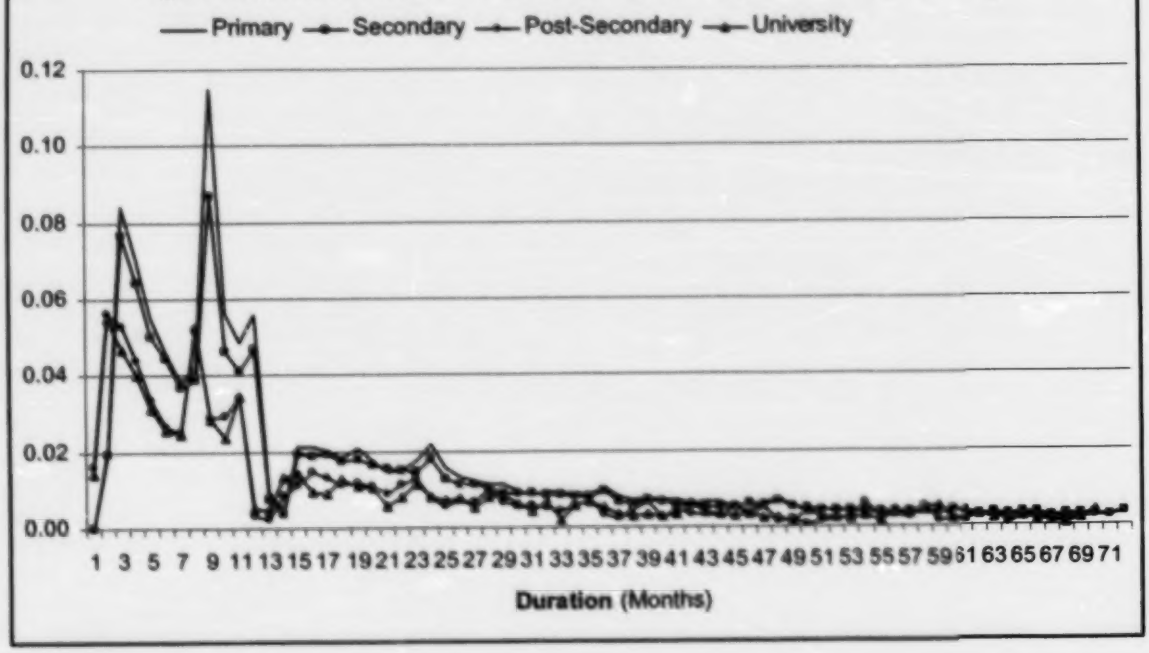


Figure 13 - **Survival Rates - Return to Welfare (Region of Residence)**

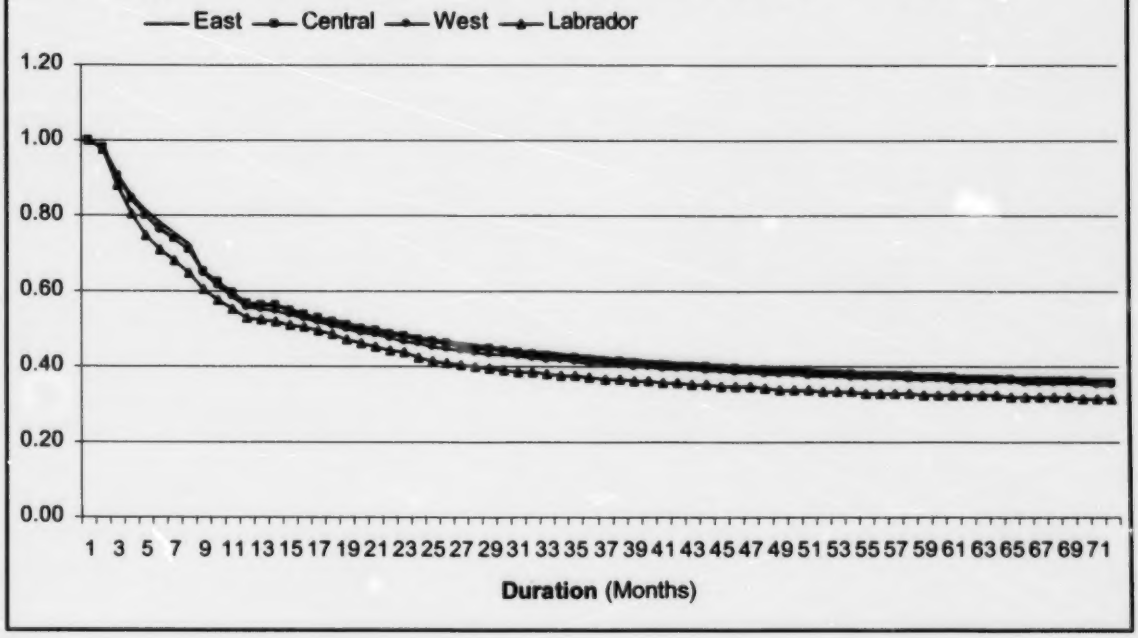


Table 11 - **Distribution of Off-Welfare Spells - Single Women**

Spell length (months)	*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*	
		Persons beginning a spell	Persons at a point in time		*Persons* beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time
	Single women 18-24			**Single women 25-30**			**Single women 30+**		
1-6	15.2	18.3	6.2	19.2	23.3	6.6	17.4	20.5	5.8
6-12	17.3	13.3	13.8	26.1	19.9	17.0	22.9	18.7	15.2
12-18	7.6	4.2	8.7	10.3	5.0	8.2	8.8	4.3	7.3
18-24	8.7	5.8	12.9	10.1	5.1	10.2	7.4	4.0	8.0
24-30	5.0	2.5	8.5	7.1	3.0	8.2	5.5	2.6	7.1
30-36	3.9	1.9	7.8	4.7	1.9	6.3	3.7	1.9	5.6
36-42	3.0	1.3	6.7	3.6	1.4	5.4	3.1	1.4	5.4
42-48	2.8	1.7	7.5	2.2	0.9	3.6	2.0	1.0	3.8
48-54	1.6	0.6	4.6	2.3	0.9	4.3	1.8	0.7	3.8
54-60	1.1	1.1	3.6	1.8	0.7	3.6	1.6	0.8	3.7
60-66	1.9	0.3	6.3	1.5	0.5	3.2	1.4	0.6	3.6
66-72	-	1.7	6.1	-	0.4	2.4	-	0.5	2.9
72+		47.3	7.3		37.1	20.9		43.2	28.0
Expected duration		58.2			64.4			72.6	

Table 12 - Distribution of Off-Welfare Spells - Single Men

Spell length (months)	Exit rate	Completed spell distribution		Exit rate	Completed spell distribution		Exit rate	Completed spell distribution	
		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time
	Single men 18-24			Single men 25-30			Single men 30+		
1-6	18.5	16.8	9.4	53.0	18.7	5.7	18.1	21.2	4.5
6-12	20.3	14.3	17.1	40.7	16.9	11.5	22.2	18.5	10.8
12-18	9.2	4.7	9.9	30.6	6.0	7.0	12.0	5.8	7.4
18-24	8.9	4.4	13.4	26.4	5.3	8.8	9.5	5.2	7.4
24-30	6.3	2.5	9.5	19.7	3.4	7.3	7.9	3.7	7.2
30-36	4.4	1.7	7.9	21.8	2.2	5.9	5.6	2.5	5.8
36-42	3.6	1.1	6.3	16.2	1.7	5.4	4.7	1.9	5.3
42-48	2.7	0.9	6.1	15.3	1.2	4.5	3.9	1.6	4.9
48-54	2.3	0.8	6.0	12.9	1.0	4.3	3.4	1.3	4.6
54-60	1.9	0.3	2.8	20.5	0.8	3.8	2.8	1.0	4.2
60-66	1.5	1.3	11.7	12.2	0.6	3.3	2.6	0.9	4.1
66-72		0.0	0.0	23.3	0.4	2.2	-	0.7	3.3
72+		51.2	0.0		41.8	30.2		35.7	30.5
Expected duration		56.8			71.6			63.0	

Table 13 - Distribution of Off-Welfare Spells - Families

Spell length (months)	Exit rate	Completed spell distribution		Exit rate	Completed spell distribution		Exit rate	Completed spell distribution	
		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time
	Single parent			Couples no children			Couples with children		
1-6	21.7	25.7	6.6	20.8	24.4	5.7	22.8	27.0	6.3
6-12	30.6	23.7	17.9	25.2	20.4	13.2	29.8	23.5	15.2
12-18	12.4	5.0	7.9	12.2	4.8	7.6	12.7	4.0	7.0
18-24	10.1	4.5	8.1	9.6	5.3	7.7	9.9	5.0	7.2
24-30	7.6	2.8	7.0	8.0	2.9	7.3	8.2	2.8	6.7
30-36	5.1	1.9	5.3	5.1	2.2	5.3	5.8	2.4	5.5
36-42	4.1	1.4	4.8	4.9	1.8	5.8	5.2	1.6	5.4
42-48	3.2	1.1	4.2	4.0	1.7	5.1	4.2	1.6	4.8
48-54	2.6	0.8	3.7	3.3	1.0	4.6	3.6	1.0	4.4
54-60	2.1	0.7	3.3	2.3	0.9	3.6	2.7	0.9	3.6
60-66	1.7	0.5	2.9	1.6	0.5	2.6	2.5	0.7	3.6
66-72	-	0.4	2.5	-	0.7	3.2	-	0.7	3.2
72+		31.4	25.9		33.5	28.4		29.0	27.2
Expected duration		56.2			59.6			53.3	

Table 14 - **Distribution of Off-Welfare Spells - Level of Schooling**

Spell length (months)	*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*	
		Persons beginning a spell	Persons at a point in time		*Persons* beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time
		Primary			**Secondary**			**College**			**University**	
1-6	21.8	25.7	6.9	20.2	23.9	5.7	16.5	19.4	5.4	15.4	18.0	4.9
6-12	30.0	23.7	18.0	26.0	20.6	14.0	18.0	14.8	11.5	17.3	14.6	10.8
12-18	12.7	4.7	8.3	11.1	4.7	7.1	7.3	3.5	6.2	7.9	3.7	6.7
18-24	10.0	4.8	8.3	9.4	4.8	7.7	6.6	4.1	7.6	5.6	3.7	6.3
24-30	8.3	2.9	7.9	7.1	2.9	6.7	4.9	2.5	6.8	4.7	2.6	6.4
30-36	5.3	2.1	5.8	5.0	2.2	5.5	3.3	1.9	5.3	3.3	1.8	5.3
36-42	4.6	1.5	5.6	4.2	1.6	5.1	2.7	1.3	4.9	2.4	1.1	4.4
42-48	3.4	1.2	4.5	3.3	1.3	4.5	2.1	1.1	4.4	2.3	1.2	4.8
48-54	3.0	0.9	4.3	2.9	1.0	4.3	1.3	0.5	2.9	1.6	0.8	3.6
54-60	2.0	0.7	3.2	2.3	0.8	3.7	2.2	1.0	5.5	1.9	1.2	5.0
60-66	1.8	0.5	3.2	2.0	0.7	3.5	1.2	0.6	3.2	1.6	0.7	4.5
66-72	1.3	0.5	2.4	1.7	0.6	3.1	1.2	0.6	3.6	0.8	0.5	2.4
72+		30.9	21.6		34.9	29.0		48.6	32.6		50.1	34.9
Expected duration		57.8			63.2			82.2			84.1	

Table 15 - Distribution of Off-Welfare Spells - Region of Residence

Spell length (months)	*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*		*Exit rate*	*Completed spell distribution*	
		Persons beginning a spell	Persons at a point in time		*Persons* beginning a spell	Persons at a point In time		Persons beginning a spell	Persons at a point in time		Persons beginning a spell	Persons at a point in time
		East			**Central**			**West**			**Labrador**	
1-6	19.4	19.3	5.6	20.4	20.5	6.0	20.4	24.4	5.9	25.5	30.3	8.3
6-12	26.9	22.5	15.2	25.7	21.0	14.3	26.6	21.1	14.5	26.1	18.3	14.3
12-18	10.8	6.4	7.1	11.2	6.6	7.4	12.0	4.8	7.7	10.7	4.1	7.1
18-24	8.8	4.6	7.5	9.3	4.8	7.9	9.4	4.9	7.7	11.7	6.2	10.1
24-30	6.8	3.2	6.7	7.3	3.5	7.2	7.3	2.8	6.8	9.1	3.0	8.6
30-36	4.7	2.1	5.4	5.2	2.3	5.9	4.9	2.1	5.3	5.4	2.1	5.9
36-42	4.0	1.7	5.2	4.3	1.8	5.4	4.1	1.5	5.0	4.5	1.4	5.4
42-48	3.2	1.3	4.6	3.3	1.3	4.7	3.0	1.2	4.0	3.7	1.4	4.9
48-54	2.7	1.1	4.3	2.8	1.1	4.2	2.8	0.9	4.0	3.3	0.9	4.8
54-60	2.1	0.8	3.6	2.2	0.8	3.7	2.2	0.8	3.5	2.5	0.8	4.0
60-66	1.9	0.7	3.5	2.1	0.8	3.8	1.8	0.6	3.2	1.6	0.4	2.7
66-72	1.4	0.5	2.8	1.5	0.5	2.9	1.6	0.6	3.1	1.6	0.6	3.0
72+		35.9	28.5		35.0	26.6		34.4	29.3		30.4	21.0
Expected duration		64.5			63.4			62.3			57.0	

From reading Tables 2 to 15 one must conclude that the dynamics of welfare participation differ considerably across socio-demographic groups. The expected mean duration on and off welfare varies substantially and in some cases in opposite directions. Ideally, these two dimensions of welfare dynamics should be integrated into a single measure of "welfare dependency." Obviously, there are many ways one could define an index of welfare dependency [see, e.g., MaCurdy (1989a)]. The one we use is simple to compute and has a neat intuitive interpretation. Let DW_i be the average spell length of household type i. Further, let DOW_i be the average duration off-welfare of the same household type. Thus, $DT_i = DW_i + DOW_i$ is the total duration of a complete cycle (on welfare – off welfare). Thus, welfare dependency can be defined as:

$$d_i = DW_i \times \frac{1}{DT_i}$$

The welfare dependency index, d_i, corresponds to the fraction of a cycle that is spent on welfare. If the cycle is repeated on and on, d_i measures the average time over a cycle that is spent on welfare. The second term on the right hand-side is the frequency with which household type i starts a new cycle. For example, if $DT_i = 100$, $1/DT_i = 0.01$, and hence, this household has one chance out of a hundred to start a new cycle each month. The index is such that a household that has long but infrequent spells may show less dependency than another household which has short but frequent spells.

Table 16 reports the indices for all the socio-demographic groups separately. Single parents stand out as having the highest dependency index of all household types. Surprisingly, single women in the 18-24 and 25-30 age groups also exhibit a relatively high dependency index. This is primarily due to the fact that the expected duration of their off-welfare spells are relatively short. Single men, on the other hand, show the lowest dependency of all household types. The middle panel of the table indicates that the level of schooling and the dependency rates are inversely related. As mentioned earlier, the differences in the dependency rates are essentially related to the expected duration off welfare and not so much the time spent off welfare *per se*. Finally, the bottom panel reports dependency rates by region of residence. It turns out they decrease somewhat as we move east to west. Despite the fact that off-welfare spells are shortest in Labrador, its dependency rate is still significantly below average.

Table 16 - **Dependency Index**

	Expected duration on welfare	*Expected duration off welfare*	*Dependency index*
Household type			
Single men 18-24	9.2	56.8	0.14
Single men 25-30	8.5	71.6	0.11
Single men 30+	10.9	63.0	0.15
Single women 18-24	13.2	55.2	0.19
Single women 25-30	13.0	64.4	0.17
Single women 30+	13.2	72.6	0.15
Single parents	14.0	56.2	0.20
Couples no children	10.4	59.6	0.15
Couples with children	9.2	53.3	0.15
Level of schooling			
Primary	11.8	57.8	0.17
Secondary	11.6	63.2	0.16
Post-secondary	10.5	62.2	0.14
University	10.1	84.1	0.11
Region of residence			
East	13.7	64.5	0.18
Central	12.0	63.4	0.16
West	11.1	62.3	0.15
Labrador	6.5	57.0	0.10

4. Econometric Analysis

The empirical analysis of the previous section rested entirely on the statistical notion of hazard rates. As mentioned previously, the main benefit of using hazard rates is the ease with which censored observations can be integrated into the analysis. Variations in hazard rates across demographic groups can be related to exogenous factors such as the unemployment rate, seasonal fluctuations in business cycles, and program parameters (*i.e.* benefits). For instance, an increase in the unemployment rate may differently affect single women and single parents. Non-parametric hazard rates such as those presented in the previous section are aggregate statistics that hide the contribution of the various exogenous factors. Econometric modeling must be called upon to identify the relative contribution of each variable.

Observed duration can not be used as a dependent variable since it can easily be shown that including censored spells in a least-squares regression will lead to biased parameter estimates.[12] On the other hand, excluding them will lead to biased parameter estimates just the same since long spells will be underrepresented in the sample.

Fortunately, there are many ways one can model duration data. The most common method is to explicitly model the hazard rates. It has become customary to follow Meyer (1990) and to specify a so-called proportional hazard function. Let

$$\lambda_i(t) = \lambda_0(t)\exp[x_i(t)\beta]$$

The term on the left-hand side is the individual exit rate at time t. The first term on the right-hand side, $\lambda_0(t)$, is the baseline hazard, *i.e.* the hazard common to all individuals. The second term captures the effect of the explanatory variables whose values may, or may not, change over time and β is an appropriately dimensioned vector of parameters to be estimated. The exponential term constrains the hazard rate to be positive. This model is said to be proportional since the exogenous variables simply multiply the baseline hazard. Intuitively, this model states that the individual hazard rates are composed of a component that is identical for each individual [$\lambda_0(t)$]

[12] The proof is similar in spirit to showing that including truncated observations in an OLS regression will lead to biased parameter estimates. The usual strategy is to turn to Tobit models. When the endogenous variable is duration it is naturally truncated since it cannot be zero. The appropriate strategy is to use duration models.

and a person-specific component $[\exp(x_i(t)\beta)]$. It is assumed that individual circumstances, as captured by $x_i(t)$ (age, benefits during the spell, unemployment rates during the spell, *etc.*), are responsible for differences in hazard rates for individuals within the same demographic group. Differences across demographic groups are accounted for by $\lambda_0(t)$ and β.

This econometric model allows for right censoring, *i.e.* the existence of ongoing spells at the end of the sample period (June 1998). The main difficulty in specifying a statistical model lies in the choice of a particular functional form for the baseline hazard. There are essentially two ways to model $\lambda_0(t)$. First, one can rely on well-known parametric models (Weibull, log-logistic, *etc.*). Second, one can approximate $\lambda_0(t)$ non-parametrically to avoid having to choose a particular functional form. In this paper we rely on the second strategy for three reasons. First, it has been used in most studies of the dynamics of welfare participation in Canada [Fortin and Lacroix (1997), Fortin, Lacroix and Thibault (1999), Barrett (1996) and Dooley and Stewart (1998)]. It is thus best to use a similar strategy for comparative purposes. Second, the parameters of the baseline hazards can provide a useful diagnostic of so-called duration dependence. Third, the approach avoids inconsistent estimation of covariate coefficients due to a misspecified baseline hazard. Meyer (1990) has shown that the log-likelihood function of the semi-parametric hazard model is given by:[13]

$$l(\gamma,\beta)=\prod_{i=1}^{N}\left[\left[1-\exp(-\exp[\gamma(k_i)+x_i(k_i)])\right]^{\delta_i}\times\prod_{t=1}^{k_i-1}\exp(-\exp[\gamma(t)+x_i(t)\beta])\right]$$

where

$$\gamma(t)=\log\left(\int_t^{t+1}\lambda_0(u)du\right)$$

represents the log of the mean of the baseline hazard between months t and t+1. The estimated γ-s trace out the baseline hazard rate. A censored spell is identified by δ_i, a dichotomous variable that equals 1 if the spell is not censored and 0 otherwise. Individuals are indexed by i.

[13] The interested reader should refer to Meyer (1990) for a detailed derivation of the likelihood function. The baseline hazard is said to be semi-parametric since it does not impose any a priori functional form on the baseline hazard. Rather it is approximated by a number of parameters. If instead a particular functional form was used (Weibull, log-logistic, *etc.*), the consistency of the slope parameters, β, would depend on that functional form being an adequate representation of the true baseline hazard. Consequently, the main benefit of the semi-parametric approach is that the slope parameters, β, are generally robust.

The vector $x_i(t)$ contains the exogenous variables for individual i at time t. There are N individuals each of whom spends k_i consecutive months on welfare per single spell. Maximizing the likelihood function will yield unbiased parameter estimates for β and γ.

A number of variables affect the length of individuals' stays on welfare. Our model allows for the inclusion of exogenous variables which are fixed or which vary over the duration of the stay. The following variables are considered constant throughout an individual's spell: level of education (number of years of school), year the spell started, and region of residence.

The following variables are defined so as to evolve over the length of a spell: age (measured in months), the seasonally adjusted unemployment rates, seasonal dummy variables, and welfare benefits. Age is measured as the total number of months at the beginning of a spell and varies linearly with duration. The unemployment rate corresponds to the three-month moving average unemployment rates computed by Statistics Canada. In this work we only distinguish between the unemployment rates in Labrador and Newfoundland as a whole. This is done to avoid problems arising from changes in the definitions of the U.I. administrative regions in 1992. The seasonal dummy variables capture variations in the business cycle that may be highly correlated across seasons and which may affect exits from welfare. Figure 3 provided evidence to that effect. The benefits correspond to the monthly long-term assistance rates. These rates were modified in 1985/04, 1988/05, 1989/07, 1990/05 and 1998/05 and were converted into1992 $ using the Newfoundland monthly CPI.

The baseline hazard is approximated by 15 parameters ($\gamma_1 \ldots \gamma_{15}$). The spells' duration are accordingly divided into 15 intervals. The first 10 intervals last one month each. The next 5 intervals last 2 months each.[14] Consequently the time-varying covariates have to be computed over the same intervals. Whenever a spell lasts more than 10 months the covariates are averaged over the two months intervals. If a spell last more than 20 months then the covariates are averaged over the remaining duration of the spell.

[14] Whenever a spell lasts more than 20 months it is treated as censored. This is necessary for econometric identification purposes. The intervals were chosen on the basis of the non-parametric analysis. Recall from tables 2-7 that there are very few spells that last more than 2 years for most demographic groups.

The benefits are computed for each household and for each of the 15 intervals considered in the baseline hazard. Since the benefits vary according to the number of children, the latter is calculated at the beginning of each interval using the birth dates. If a birth occurs in the midst of a two-month interval, then the average benefit is used. The same strategy is used to compute seasonal effects, age and unemployment rates. Estimation of the econometric model described above allows us to study the impact of different exogenous variables on the rate of exit from welfare.

Tables 17-19 present the estimation results. Each table is divided into three panels. The top panel contains parameter estimates associated with variables that are constant throughout the spells. The second contains the parameter estimates of the time-varying covariates. Finally, the third panel contains the parameters of the baseline hazard rates. These parameters trace out the hazard that is assumed common to all individuals in a given age group.

4.1 Results for single women

The first two tables focus on singles. Each of these tables is divided into the same three age groups as those that were analyzed in the non-parametric section. Table 17 pertains to single women. In this table, as in all other tables, most parameter estimates are highly statistically significant. This is both the result of using large samples and the consequence of fitting a model that is well suited to the data. As the results for the three age groups are relatively similar they will be analyzed simultaneously.

The year dummy variables capture the effects of factors that are not controlled for in the regressions. Since the 1992 year dummy is omitted from the regression, the parameter estimates of the other year dummies must be interpreted as a differential impact with respect to that year. The parameter estimates are relatively similar across the three age groups. The few cases where the signs do not agree are usually associated with estimates that are not statistically significant. All else equal, it seems the exit rates in the years from 1986-1994 were higher than they were in 1992. In 1995-1996 they were somewhat lower and in 1997-1998 they increased considerably. Since we control for the unemployment rate, these fluctuations in the exit rates can not be attributed to variations in the business cycles. Other factors not accounted for in the regressions are causing these variations.

Table 17 – **Parameter Estimates - Single Women**

Variable	18-24		25-30		30+	
	Parameter	*Std.-Err*	*Parameter*	*Std.-Err*	*Parameter*	*Std.-Err*
Constant variables						
Year Effect						
1986	1.374	0.057	1.145	0.119	0.798	0.055
1987	1.161	0.053	1.077	0.109	1.049	0.050
1988	1.200	0.060	1.168	0.119	1.176	0.060
1989	0.179	0.086	0.007	0.201	-0.515	0.117
1990	0.513	0.063	0.582	0.139	0.491	0.070
1991	0.692	0.047	0.399	0.117	0.443	0.054
1993	0.072	0.048	-0.009	0.113	0.237	0.048
1994	0.130	0.048	-0.058	0.116	-0.029	0.052
1995	-0.400	0.060	-0.713	0.152	-0.874	0.089
1996	-0.096	0.059	-0.293	0.142	-0.523	0.091
1997	0.279	0.072	0.118	0.177	-0.061	0.136
1998	1.186	0.136	1.295	0.217	0.925	0.169
Region						
East	-0.067	0.031	0.008	0.067	-0.033	0.032
Central	0.012	0.031	0.135	0.076	-0.020	0.035
Labrador	1.766	0.078	1.782	0.177	1.604	0.097
School	0.646	0.052	0.514	0.096	0.101	0.029
Time-varying covariates						
Age/1000	0.176	0.049	-0.213	0.119	0.147	0.007
Benefits/1000	-1.109	0.051	-1.105	0.103	-1.341	0.052
UI-Rate/10	-1.996	0.096	-1.738	0.217	-1.972	0.113
Season Effects						
Spring	0.657	0.037	0.364	0.070	0.854	0.035
Summer	0.867	0.043	0.397	0.085	0.969	0.043
Fall	0.570	0.044	0.367	0.084	1.025	0.043
Baseline hazard						
1	0.038	0.009	0.008	0.005	0.010	0.002
2	0.052	0.012	0.016	0.009	0.016	0.003
3	0.070	0.016	0.018	0.010	0.030	0.006
4	0.074	0.017	0.018	0.011	0.043	0.009
5	0.074	0.017	0.022	0.013	0.051	0.011
6	0.081	0.019	0.025	0.015	0.047	0.010
7	0.091	0.022	0.027	0.016	0.054	0.011
8	0.081	0.019	0.029	0.017	0.056	0.012
9	0.084	0.020	0.033	0.020	0.059	0.013
10	0.092	0.022	0.032	0.019	0.062	0.014
11-12	0.080	0.019	0.026	0.015	0.059	0.012
13-14	0.078	0.019	0.027	0.016	0.059	0.013
15-16	0.089	0.022	0.035	0.021	0.080	0.017
17-18	0.081	0.020	0.029	0.017	0.064	0.014
19-20	0.100	0.024	0.027	0.016	0.066	0.014
No. of observations	12,339		3,265		13,009	

Since the dummy variable for the western region has been omitted, the other regional dummy variables represent the differentiated impact of living in another region. The parameter estimates are consistent with the non-parametric findings reported earlier. Indeed, there seems to be very

little difference between the East, West and Central regions. Individuals living in Labrador, on the other hand, have considerably higher exit rates than those living in Newfoundland. No explanations can be offered for this result, but the difference is dramatic and statistically very significant.

Not surprisingly, the parameter estimates associated with schooling are positive and statistically significant. Interestingly, an additional year of schooling increases the exit rates of the younger group much more so than that of the older group.[15] One must be cautious in interpreting the parameter estimates associated with schooling. Indeed, to the extent the level of schooling is a choice variable it may simply reflect heterogeneity in the population. In other words, it is probably wrong to claim that a one-year increase in the level of schooling will have the same marginal effect for everyone in the sample. Those with more schooling simply behave differently from those with less schooling.

The next panel of the table presents results pertaining to time-varying covariates. First, the relation between the hazard rates and age appears to be U-shaped. They are positively related for women in the 18-24 age group, negatively related for those in the 25-30 age group and positively related for the oldest age group. The parameter estimates of the benefits variable are negative, statistically significant and nearly identical for the three cohorts. This result supports the claim that, *ceteris paribus*, an increase in benefits will translate into longer spells duration. It is also consistent with similar results found in British Columbia [Barrett and Cragg (1998)] and Quebec [Fortin and Lacroix (1997)]. The next line concerns the unemployment rate. It is clear that exits from welfare are intimately related to changes in the business cycle. Increases in the unemployment rate drastically reduce the exit rates and hence increase the mean duration. The last three lines report differences in seasonal exit rates. Not surprisingly, exits from welfare are at their lowest during the winter and at their highest during the summer. The seasonal fluctuations are greatest among women in the 18-24 age group, ranging from 0.57 to 0.86. Exit rates in the other groups depict much less variation across seasons.

The last panel of the table reports the baseline hazard rates. As mentioned earlier, these parameter estimates trace out a component of the exit rates that is assumed the same for

[15] A similar result was found in Quebec (see Duclos, *et al.* (1999)).

everyone. A simple comparison across age groups shows that women in the 18-24 and 30+ age groups have higher baseline hazard rates than women in the 25-30 age group. This simply indicates that, given similar individual characteristics, women in the latter group tend to have lower exit rates, or longer spells on average. The main conclusion to be drawn from these parameter estimates, though, is that women in all three age groups do not depict so-called duration dependence. The fact that the baseline hazard rates initially increases and eventually remains constant indicates that the probability of leaving welfare does not decrease with duration.[16]

4.2 Results for single men

Table 18 reports parameter estimates for single men. The setup of the table is identical to the previous one. In general the results are very similar to those of single women. First, the exit rates were higher between 1986 and 1991 than they were in 1992, but lower from 1993 to 1996. They have increased to previous levels only in the course of the last two years. The regional dummy variables indicate that there is very little systematic differences between the regions of Newfoundland. Labrador, on the other hand, has much higher exit rates than any other region. The parameter estimates are very close to those found for single women. Finally, schooling is also associated with higher exit rates. An additional year of schooling will raise exit rates of the younger group more than that of the older group. Interestingly, the parameter estimates are somewhat lower than the corresponding ones of single women. This result is also consistent with those reported in Fortin and Lacroix (1997) for Quebec.

The relation between exit rates and age is U-shaped just as it was for women. The parameter estimates associated with welfare benefits are highly statistically significant and imply that higher benefits are conducive to lower exit rates. The parameter estimates of the unemployment rates are negative and nearly identical to those of women. Hence, much of the variation in the exit rates is related to the business cycle. Finally, the exit rates of single men also depict strong seasonal variation. They are highest in the summer, lowest in the winter and fluctuate

[16] There are no contradictions between the econometric results and those of the descriptive analysis with respect to negative duration dependence. Recall that the descriptive analysis does not control for any change in exogenous variables across individuals and through time. Once these are accounted for, the apparent negative duration dependence simply disappears.

considerably across seasons. The seasonal variations are more pronounced in the younger group than the older groups.

Table 18 - **Parameter Estimates - Single Men**

Variable	18-24		25-30		30+	
	Parameter	*Std.-Err*	*Parameter*	*Std.-Err*	*Parameter*	*Std.-Err*
Constant variables						
Year Effect						
1986	1.141	0.055	0.951	0.059	1.077	0.050
1987	1.167	0.055	0.878	0.057	1.169	0.046
1988	1.154	0.071	0.901	0.073	1.163	0.055
1989	0.064	0.114	-0.252	0.130	-0.324	0.103
1990	0.362	0.067	0.130	0.076	0.199	0.062
1991	0.493	0.051	0.206	0.062	0.369	0.047
1993	-0.097	0.048	-0.189	0.056	-0.076	0.044
1994	-0.094	0.048	-0.229	0.062	-0.336	0.050
1995	-0.418	0.058	-0.708	0.084	-1.035	0.075
1996	-0.063	0.058	-0.414	0.084	-0.550	0.071
1997	0.225	0.072	-0.229	0.121	-0.060	0.092
1998	0.846	0.142	0.653	0.184	0.645	0.173
Region						
East	-0.128	0.033	-0.077	0.036	-0.056	0.032
Central	-0.033	0.033	-0.053	0.042	0.013	0.035
Labrador	1.656	0.082	1.703	0.101	1.870	0.083
School	0.448	0.048	0.230	0.046	0.115	0.029
Time-varying covariates						
Age/1000	0.368	0.050	-0.160	0.068	0.102	0.008
Benefits/1000	-0.933	0.052	-0.944	0.061	-1.116	0.050
UI-Rate/10	-1.765	0.099	-1.803	0.121	-2.175	0.100
Season Effects						
Spring	0.558	0.037	0.421	0.042	0.772	0.035
Summer	0.631	0.044	0.554	0.049	0.867	0.042
Fall	0.332	0.045	0.349	0.050	0.752	0.042
Baseline hazard						
1	0.079	0.019	0.008	0.002	0.011	0.002
2	0.110	0.026	0.014	0.004	0.016	0.003
3	0.122	0.029	0.014	0.005	0.022	0.004
4	0.136	0.032	0.016	0.005	0.027	0.005
5	0.129	0.031	0.015	0.005	0.027	0.005
6	0.151	0.036	0.024	0.008	0.032	0.006
7	0.168	0.041	0.023	0.008	0.034	0.007
8	0.147	0.036	0.021	0.007	0.035	0.007
9	0.160	0.039	0.026	0.009	0.047	0.010
10	0.168	0.042	0.023	0.008	0.047	0.010
11-12	0.139	0.034	0.021	0.007	0.042	0.009
13-14	0.149	0.037	0.022	0.008	0.045	0.009
15-16	0.162	0.041	0.030	0.010	0.051	0.010
17-18	0.178	0.045	0.034	0.012	0.052	0.011
19-20	0.156	0.039	0.033	0.011	0.056	0.012
No. of observations	38,599		9,921		18,290	

The baseline hazard rates of men in the 18-24 age group are much higher than those of other age groups and much higher than those of women in the same age group. On average, then, we should expect men in this age group to have shorter spells than women in the corresponding age group, for given individual characteristics. Just as was true of single women, the hazard rates do not decrease with the duration of the spells. If anything, they actually increase with time spent on welfare. Thus it must be concluded that single men do not exhibit negative duration dependence.

4.3 Results for families

The results concerning families are reported in Table 19. Qualitatively, they are very similar to those related to single men and women. The year effects show that the exit rates gradually decline between 1986 and 1996 and then slowly recover in 1997-1998. The eastern region has lower exit rates than the western region, and Labrador once again has drastically higher exit rates than any other region. As before, more schooling is conducive to higher exit rates, but the relation appears much more pronounced for single parents.

Contrary to single individuals, age seems to have very little effect on the exit rates. On the other hand, families with more children tend to have higher exit rates. Although there are no clear reasons with this should be so, one can imagine that larger families have on average proportionately more school-age children. If this is so, it may be easier to return to the labour market.

The parameter estimates also indicate that benefits as well as the unemployment rate have a negative impact on the exit rates. The season effects also show that there is considerable variation in the exit rates across seasons. Interestingly, the parameter estimates associated with Summer and Fall are nearly identical. This suggests that families are just as likely to exit welfare in either seasons. Finally, the baseline hazard rates are constantly increasing with spell duration. In fact, the baseline hazard rates of families with children increase significantly beyond one year. It is thus clear that families, just like single individuals, do not suffer from duration dependence.

Table 19 - **Parameter Estimates - Families**

Variable	Single parents		Families with children		Families no children	
	Parameter	*Std.-Err*	*Parameter*	*Std.-Err*	*Parameter*	*Std.-Err*
Constant variables						
Year Effect						
1986	1.241	0.053	1.061	0.050	1.038	0.048
1987	1.233	0.052	0.960	0.047	1.116	0.045
1988	1.365	0.058	1.014	0.056	1.085	0.053
1989	0.336	0.084	-0.362	0.110	-0.401	0.111
1990	0.732	0.065	0.404	0.064	0.435	0.060
1991	0.903	0.049	0.406	0.051	0.530	0.049
1993	0.244	0.053	0.122	0.049	0.173	0.045
1994	0.074	0.058	-0.160	0.057	0.038	0.052
1995	-0.621	0.085	-0.834	0.092	-0.803	0.078
1996	-0.397	0.083	-0.555	0.093	-0.449	0.078
1997	0.207	0.107	-0.220	0.141	-0.096	0.113
1998	1.061	0.140	0.406	0.163	0.428	0.149
Region						
East	-0.261	0.031	-0.199	0.031	-0.082	0.029
Central	-0.028	0.032	0.031	0.029	-0.007	0.029
Labrador	1.395	0.080	1.548	0.084	1.458	0.077
Number of children	0.348	0.020	0.208	0.016		
School	0.308	0.046	0.180	0.038	0.135	0.030
Time-varying covariates						
Age/1000	-0.003	0.010	0.013	0.009	0.029	0.006
Benefits/1000	-0.995	0.038	-0.605	0.032	-0.777	0.035
UI-Rate/10	-1.506	0.098	-1.738	0.107	-1.606	0.097
Season Effects						
Spring	0.292	0.036	0.230	0.036	0.194	0.035
Summer	0.592	0.040	0.491	0.038	0.440	0.038
Fall	0.561	0.042	0.562	0.038	0.440	0.037
Baseline hazard						
1	0.022	0.004	0.023	0.004	0.013	0.002
2	0.024	0.004	0.028	0.005	0.018	0.003
3	0.045	0.008	0.041	0.008	0.027	0.005
4	0.051	0.009	0.053	0.010	0.034	0.006
5	0.053	0.010	0.058	0.011	0.037	0.007
6	0.065	0.012	0.060	0.012	0.039	0.007
7	0.065	0.012	0.074	0.015	0.047	0.009
8	0.062	0.012	0.076	0.015	0.045	0.009
9	0.071	0.013	0.093	0.019	0.055	0.011
10	0.076	0.015	0.084	0.017	0.054	0.011
11-12	0.071	0.013	0.092	0.018	0.046	0.009
13-14	0.070	0.013	0.095	0.019	0.055	0.011
15-16	0.083	0.015	0.124	0.026	0.067	0.014
17-18	0.081	0.016	0.103	0.022	0.060	0.012
19-20	0.071	0.013	0.108	0.023	0.056	0.012
No. of observations	75,356		68,702		9,016	

5. Conclusion

The growth in expenditures on Canadian social assistance programs and the increase in the number of claimants up until recently has led to many calls for thorough reforms of the programs. In the past few years, a certain number of studies have examined the dynamics of welfare participation in different provinces in Canada (British Columbia, Ontario, Quebec). Such studies contribute to our understanding of these dynamics, which is essential for any enlightened discussion of possible reforms.

In this paper we have used data from the 100% Social Assistance Recipients File for the years 1986-1998, and made available to us by Human Resources Development Canada, to gain some insight into the dynamics of welfare participation in Newfoundland. To that end, non-parametric tools were used to characterize spell duration, exit and re-entry rates for several categories of households and help identify high-risk groups. This analysis was complemented with an econometric analysis that supports most of the non-parametric results.

We find that the majority of starting spells (approximately 75%) will last less than one year. Exit rates tend to decrease rapidly at the start of the spells and remain relatively constant thereafter. While most new spells are relatively short, a certain proportion of ongoing spells will last beyond 6 years.

Overall, single men leave welfare more rapidly than single women, and the more educated a little sooner than the less educated. It also appears that the business cycle has a significant influence on the entry and exit dynamics. Thus the exit rates in the first six months of 1987 and 1988, two years of strong economic growth, were approximately 40% while the corresponding number for the first six months of 1992 was barely 23.3%. Individuals living in Labrador have considerably higher exit rates that those living in any other region of Newfoundland. Another robust finding concerns the drastic increase in the exit rates at approximately 6 years. This result is intriguing and certainly warrants further investigation.

Returns to welfare generally occur shortly after exit, and at a rate which diminishes with time. Re-entry occurs faster for those that have little education. For instance, nearly 50% of those who

have a primary education return to welfare within a year following an exit. For the university trained only 32% return to welfare within a year.

These results by and large are supported by the econometric models. One noteworthy exception concerns duration dependence. The non-parametric analysis showed that the exit rates of all demographic groups decreased steadily with duration. This phenomenon is often referred to as negative duration dependence in the literature. Negative duration dependence can be an intrinsic feature of the data, but it can also be a statistical artifact that is generated by unobserved heterogeneity or observed heterogeneity that is not controlled for. Our results show that once individual characteristics, program parameters and macroeconomic variables are accounted for, the data exhibit no duration dependence. That result implies that individuals are just as likely to exit welfare at the beginning of their stay as at any other point, conditional on the aforementioned variables.

The econometric results also show that exits from welfare are intimately related to age and to the level of schooling, as well as to the business cycles, to seasonal fluctuations in economic activities and to the level of benefits. Furthermore, there appear to be systematic differences in exit behavior between individuals living in Labrador and those living in the other regions of Newfoundland. This is true of all demographic groups that we have studied.

In a sense, the results presented in this paper are not very surprising. The studies on British Columbia, Ontario and Quebec similarly concluded that benefits and business cycle conditions are among the important factors that affect exits from welfare. Nevertheless, the results reported here underline the specific aspects of the dynamics of welfare participation in Newfoundland and will hopefully be helpful to policy makers.

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